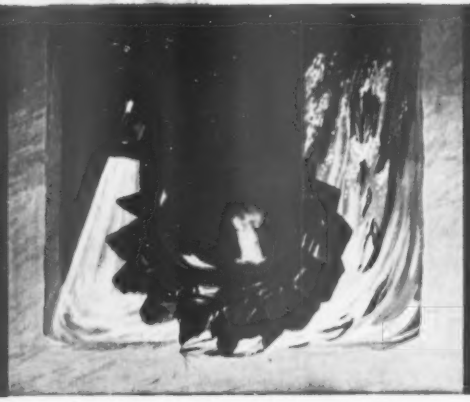
THE AUTOMATIC OIL FIELD
. . . SEE PAGES 90-100

# the OIL AND GAS JOURNAL

REED
twin
blast
ROCK
BITS



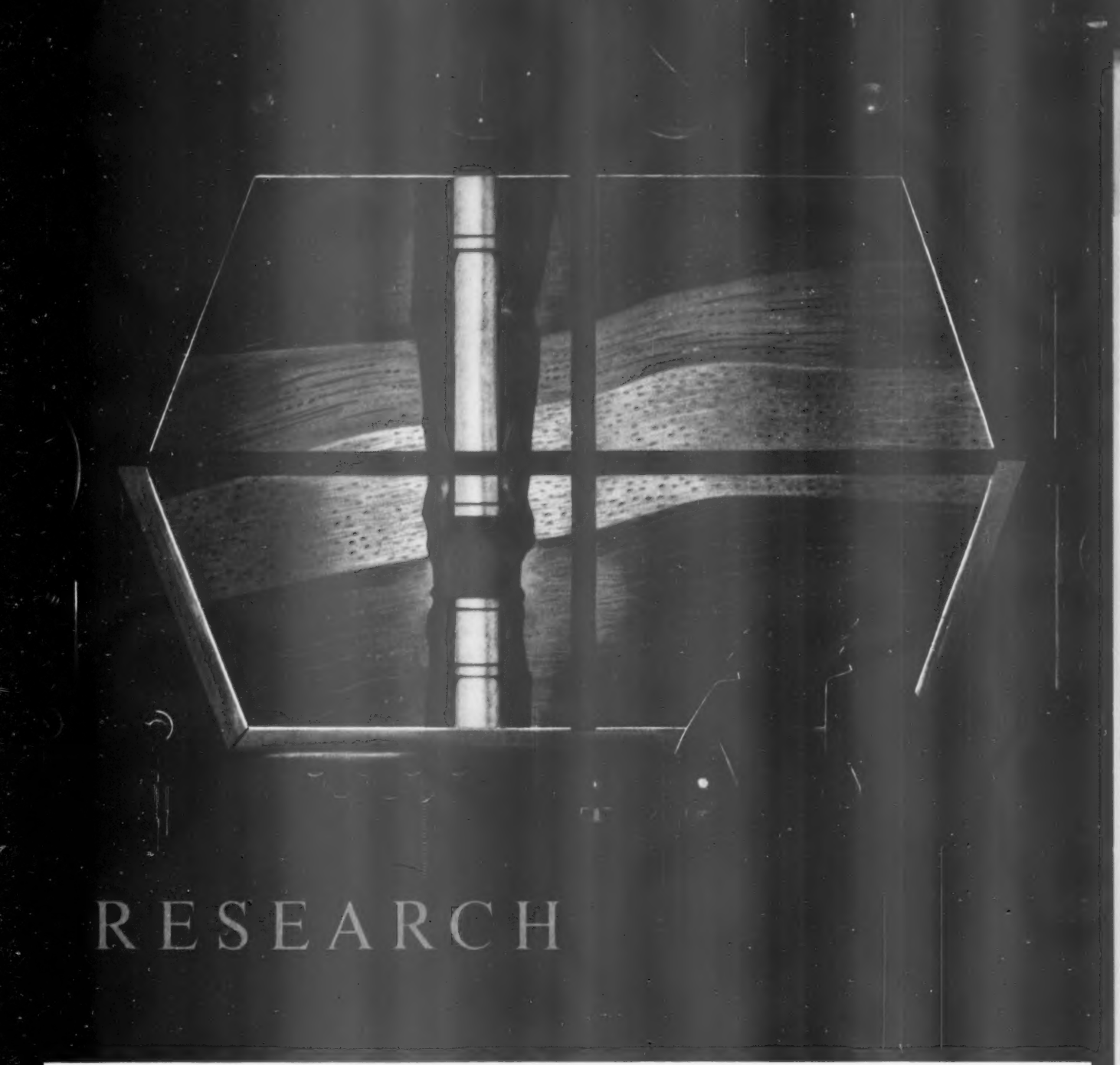
Slush from the nozzles of **REED** Twin-Blast Rock Bits blasts against the bottom of the hole and sweeps across at high velocity — carrying cuttings up into the return mud stream immediately so cutter teeth can work on new formation.

The result of this efficient bottom hole cleaning action is faster drilling, more hole per bit, fewer round trips and lower drilling costs.

4371

**REED** ROLLER BIT COMPANY
Houston 1, Texas

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 JULY 20, 1953



# RESEARCH

## The Testing Tool on Tomorrow's String

We're prone to take for granted the practices of today. Yet a few years ago they were just ideas being thoroughly worked out in research laboratories. For example, there's Halliburton's new Hydrospring Tester. Years of research have gone into developing this revolutionary tool. And a full year of field use proved its performance with a perfect record on more than 1500 jobs. Now a successful test with Hydrospring is taken for granted. And the scientists who developed it are busy on new research projects in tools and technology. This research is the testing tool on tomorrow's string, probing into the formations of the future. That's what makes Halliburton first in its field, for such energetic research holds the place of highest concern at Halliburton.

**HALLIBURTON OIL WELL CEMENTING COMPANY,** DUNCAN, OKLAHOMA

PERPETUAL PROGRESS IN PRODUCTION IMPROVEMENT TECHNIQUES

the OIL AND GAS JOURNAL

JULY 20, 1953 VOL. 52 NO. 11

## OIL IN THE NEWS . . .


| | |
|---|---|
| Pilot Yields of New Cat Reforming Process Said Excellent | 64 |
| Oil's Technical Men Read Better Than Executives, Test Shows | 65 |
| Pollution Abatement Not Enough, Public Must Be Told, Judge Says | 67 |
| Operators Active in Shallow Waters of Texas-Louisiana Coast | 68 |
| Court Battle Over Casing-Import Question May Be Decided Soon | 69 |
| Kerr-McGee Finds Oil in Lower Paleozoic in South Dakota | 69 |
| Continental to Direct Operations of Yellowstone Products Line | 69 |
| Commission Says Spraberry Flaring to Be Strictly Prohibited | 70 |
| Texas Offers Legal Assistance in Defense of Tidelands Law | 70 |
| Revocation of Price Boosts Would Hurt Small Refiners | 71 |
| Efforts Being Made to Rush Through Quotas on Imports | 74 |
| Venezuela Claims Net Additions to Reserves Last Year | 78 |
| Three Companies Step Up Search in Greater Oficina Area | 81 |
| New 10,000-Bbl. Refinery to Be Built in Puerto Rico | 81 |
| First Process Units Going Up at Aden Refinery | 82 |
| Tanker Shipments Through Suez Canal Show Increase | 82 |
| Egyptian Output to Drop Unless Exploration Is Resumed | 85 |
| Northeast Utah's Recent Discoveries | 169 |
| Sixteen Discoveries in 2 Years in Santa Clara Valley | 170 |


## NEWS FEATURES . . .


| | |
|---|---|
| They Say | 53 |
| Calendar of Events | 54 |
| Journally Speaking | 59 |
| Editorial | 61 |
| This Week | 63 |
| Watching Washington | 73 |
| International News | 78 |
| Personals | 87 |
| Deaths in the Industry | 89 |
| Pipe-Line News | 157 |
| Drilling Contractors | 161 |
| Natural-Gas News | 165 |
| Natural-Gasoline News | 165 |
| Refining News | 166 |
| Petrochemical Notes | 167 |
| Exploration Statistics | 191 |
| Production Statistics | 192 |
| Refining Statistics | 193 |
| Market Statistics | 194 |


## TECHNOLOGY AND OPERATION . . .


| | |
|---|---|
| [1]Control of Oil-Field Producing Operations<br>*By Robert L. Beckwith* | 90 |
| [2]Estimation of Crude-Oil Corrosivity | 100 |
| [3]Practical Application of Fluid Hydraulics in Drilling<br>*By Glenn D. Thompson* | 105 |
| [4]South Dakota Steps Up Exploration<br>*By John Paul Gries* | 114 |
| Identify This Equipment | 122 |
| Salt-Water Disposal Equipment<br>*By C. Malcolm Davis* | 124 |
| [5]Use of Piston-Operated Pipe-Line Valves<br>*By F. M. Partridge and G. C. Wilson* | 125 |
| [3]Reducing Sound of Pipe-Line Compressor Engines<br>*By W. N. Lindblad* | 126 |
| On The Job . . . Fields and Plants | 128 |
| Engineering Reference Section | 135-145 |
| Equipment Digest | 151 |


## DEPARTMENTS . . .


| | |
|---|---|
| Books | 120-127 |
| Journal Check Chart | 122 |
| On the Job . . . In the Plants | 128 |
| On the Job . . . In the Fields | 132 |
| Engineering Reference | 135 |
| Engineering Fundamentals | 137 |
| Heat Transfer | 140 |
| Corrosion Control | 141 |
| Progress in Metals | 143 |
| Refiner's Notebook | 145 |
| Equipment Men in News | 146-198 |
| Equipment Digest | 151 |
| Active Rotary Rigs | 162 |
| Areal Field Reports | 172 |
| Classified Advertising | 195 |
| Advertisers' Index | 199 |


## In Brief . . .

**1. PRODUCTION CONTROL . . .** Automatic equipment can be obtained to take care of these important functions on producing wells: (1) start and stop production from wells; (2) measure the quantities of oil, gas, and water from each well and all wells on given property; (3) shut in well or wells whenever equipment fails; and (4) obtain records of individual production rates, total production rates, and oil and gas delivered or sold. In most cases the devices used have clearly demonstrated they can do a good job on these production activities.

•

**2. CRUDE-OIL CORROSIVITY . . .** Standard Oil Co. (Ind.) and Pure Oil Co. have developed methods whereby a refiner may compare performance of a known crude against the probable performance of an unknown crude. Standard Oil method is based on change in electrical resistance of a steel specimen after exposure to a definite volume of crude oil under specified conditions. Pure Oil method is based on the volume of hydrogen sulfide released under fixed conditions.

•

**3. DRILLING TECHNIQUE . . .** Running a jet-type bit in the hole without proper consideration of the horsepower available and circulating system will not result in improved bit performance. A practical knowledge of hydraulic equipment is required to prevent the circulating pressure from exceeding the capacity of the power pump. Better utilization of the hydraulic horsepower available will contribute to reduction in drilling cost.

•

**4. STEPPED-UP EXPLORATION . . .** South Dakota exploration activities are being increased as the result of discovery of commercial oil in North Dakota in 1951. Seven oil tests were started in South Dakota in 1951, 17 started in 1952, and 11 are either drilling or have announced locations in 1953.

•

**5. PIPE-LINE IMPROVEMENTS . . .** Oil-filled piston-operated valves for pipe-line service enable more accurate positioning, offer reduced maintenance, can easily be installed with valves in service, remain in operating position on oil-system failure, and provide for elimination of complex pressure-limiting stations. Acoustic filters, installed on air intakes to reciprocating compressor engines, can be used to eliminate a noise problem. Before installation at Hinkley compressor station of Pacific Gas & Electric Co., noise was objectionable at point 2,000 ft. from plant. Noise was not discernible after filter installation.

# Where Else

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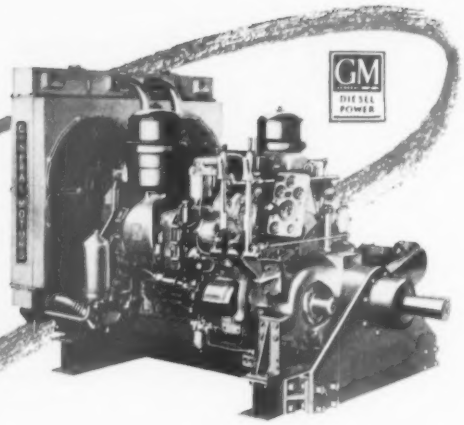


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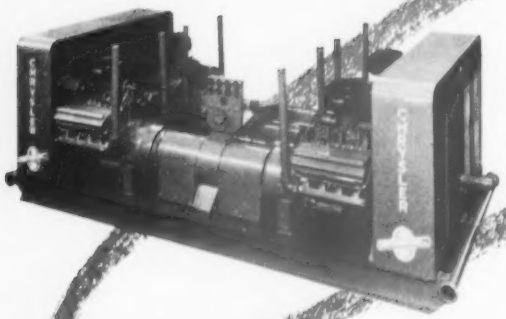

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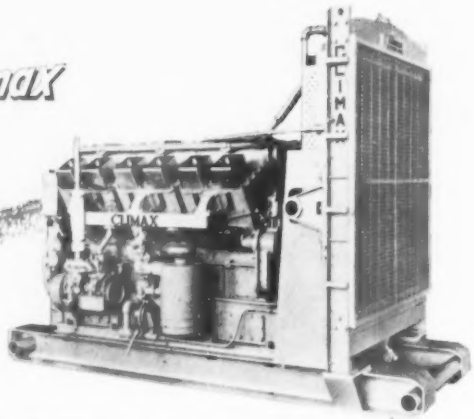


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"OILWELL" engineers have completed a series of liner field tests which add evidence to the contention that abrasion resistance results from low coefficient of friction as well as from surface finish and hardness.

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DI-HARD has the lowest coefficient of friction of any known metal suitable for liner applications and is more resistant to wear by a corresponding degree. If you are using any other liners in your "Oilwell" pumps, switch to DI-HARD and learn for yourself how much "extra service" they give.

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USS TRADE MARK

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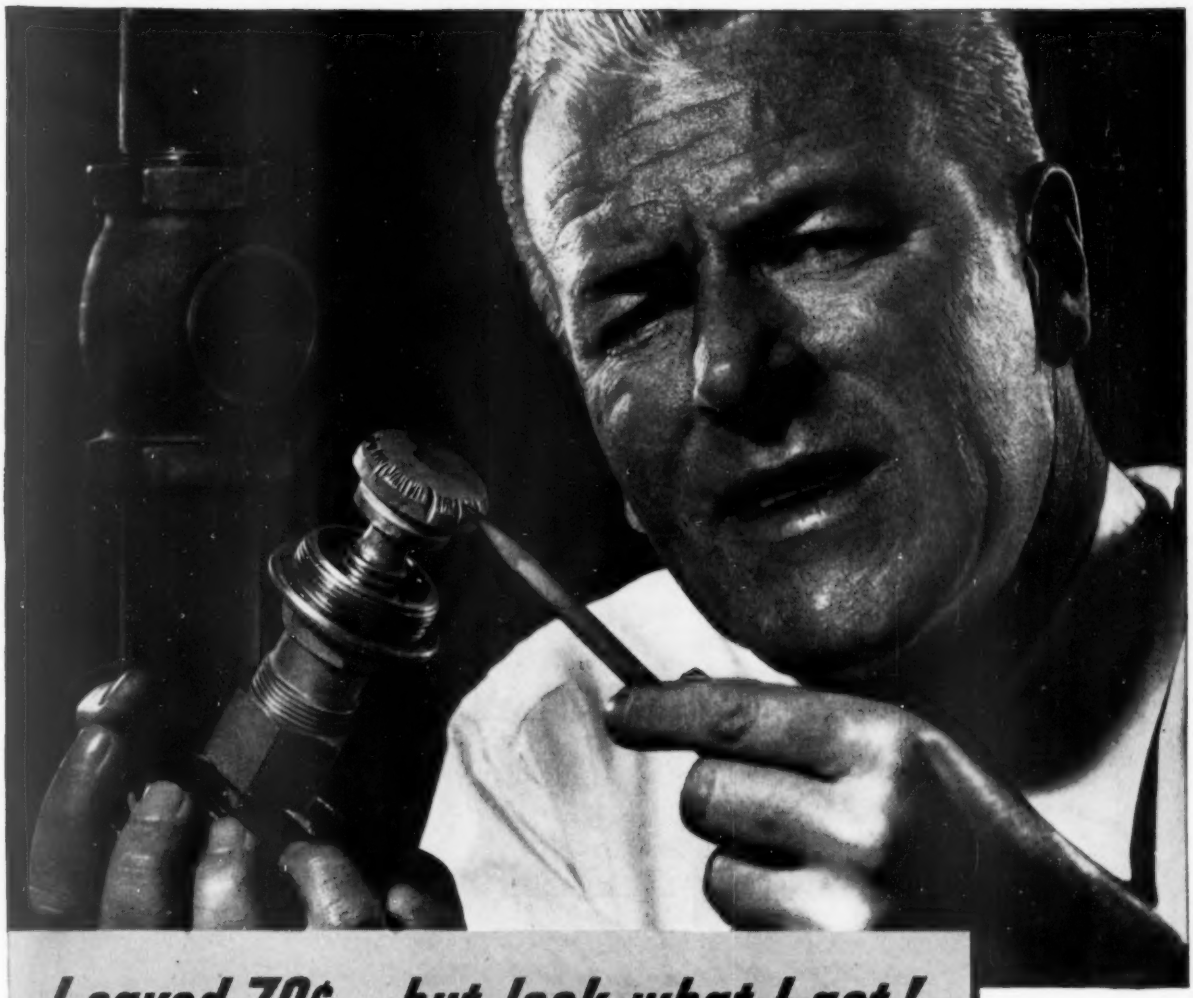

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This buyer might give himself an "A" for effort, but that's all! Seventy cents saved per valve would have been worth while if—if it hadn't been just a "price tag value."

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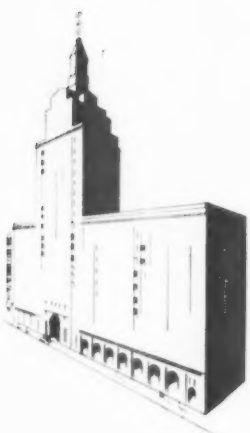
# Assistance



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1. It resists acid and other corrosive conditions.
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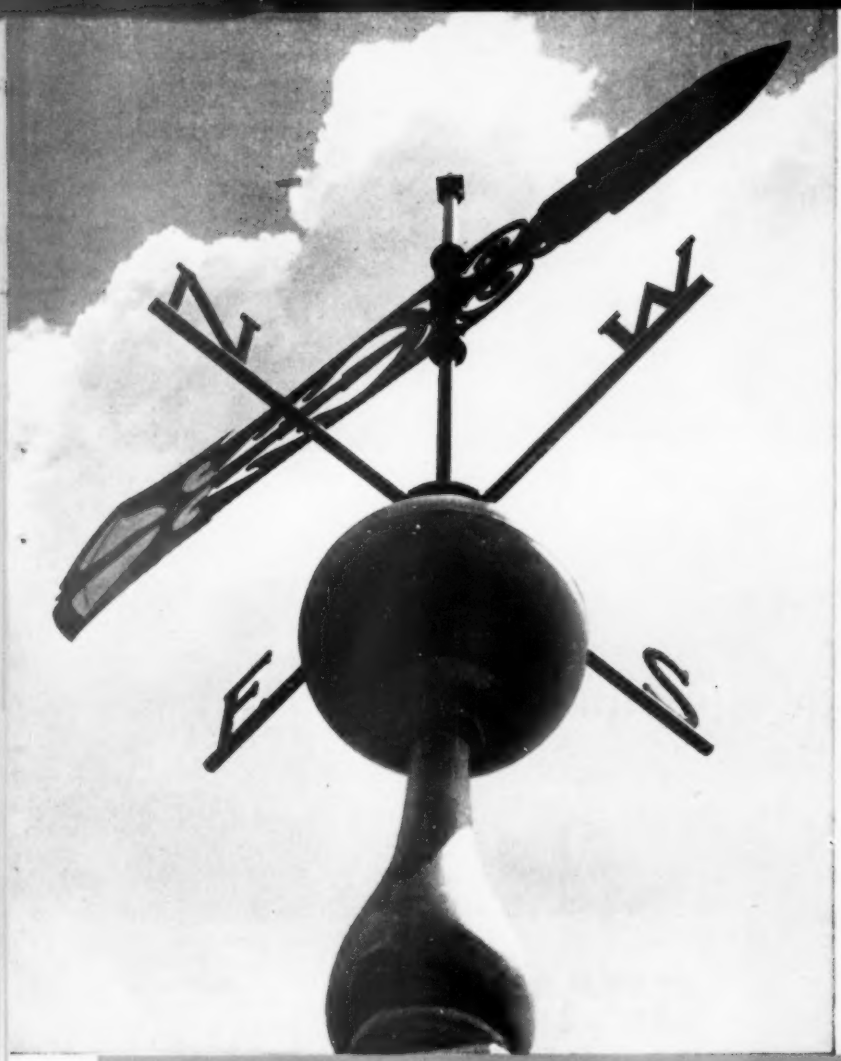

# A Four-Way Selection

This photograph of a weather vane seems a good way to point out the fact that there are four different types of Midwest Welding Elbows (see below). These are more types than are manufactured by any other company. This greater selection is important to users of welded piping because it gives the engineer greater latitude in piping design and permits improvements and economies not otherwise possible in welded piping systems. For more information on this subject, ask for Catalog 48.

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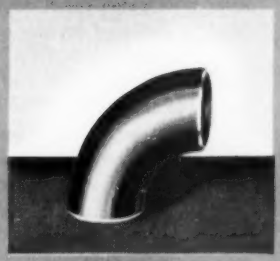
Same radius as ASA but tangent equal to 25% of nominal pipe size on each end. Saves pipe, layout and welding time. Costs no more than ASA. Sizes to 24".



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Recommended where space is limited. Sizes to 30". Also available with "Long Tangents" in sizes 14" to 30".

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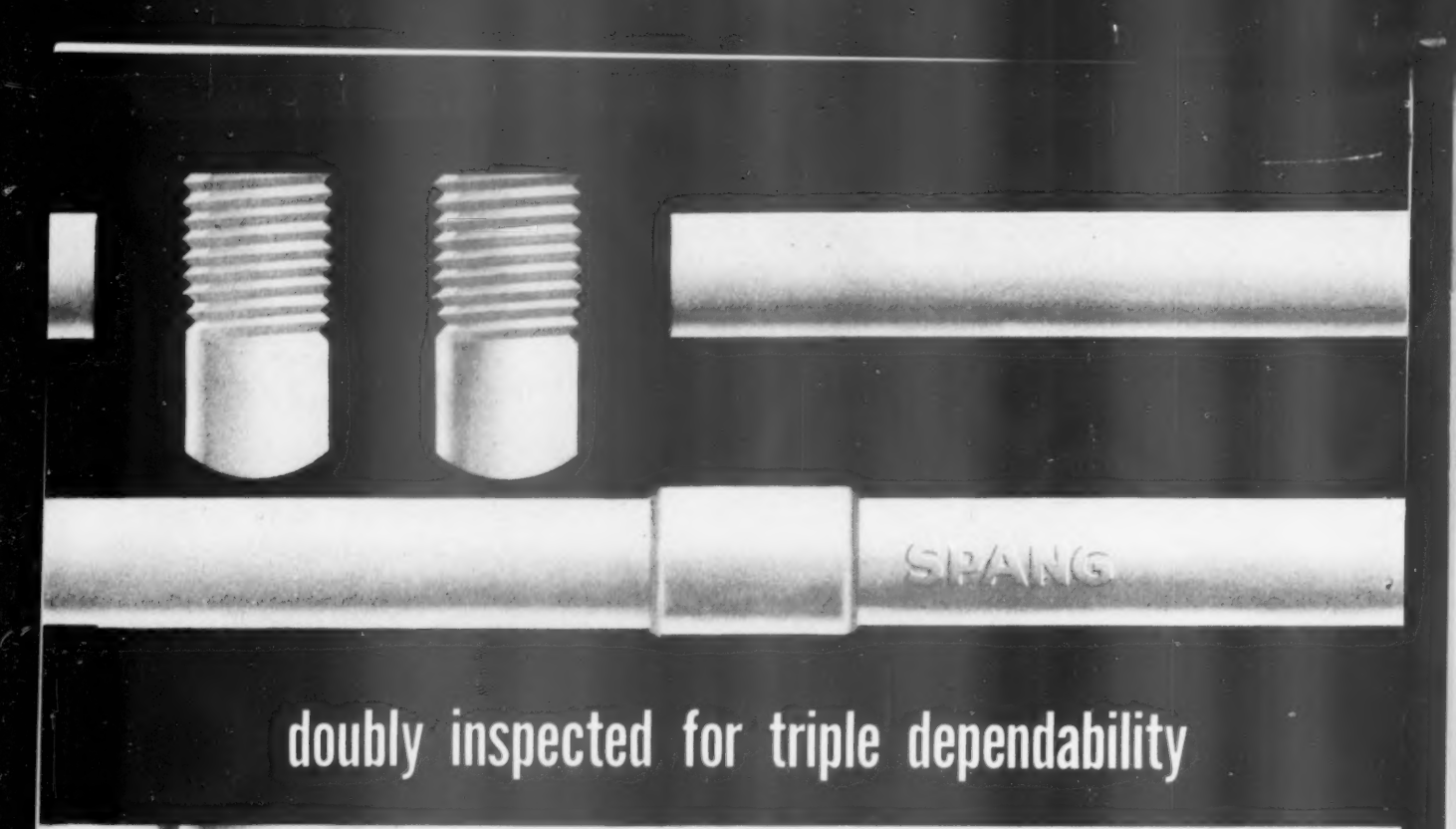
Takes the place of a straight size elbow and a reducer. Eliminates one weld, reduces pressure drop, easier to insulate. Sizes to 12", reductions to half size.

# MIDWEST WELDING FITTINGS

**IMPROVE PIPING DESIGN AND REDUCE COSTS**

4103

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After strict metallurgical control during its manufacture, SPANG "CW" is inspected not only once . . . but twice!

Doubly inspected SPANG "CW" assures you of oilfield pipe of triple dependability. First of all, you can depend on the uniformity of SPANG "CW" for easier cutting, bending and threading—faster installation at less cost. Secondly, you can count on SPANG "CW" Steel Pipe for dependable service in oilfield applications—water systems, oil-gathering systems, air lines, gas lines, water flooding lines or salt water disposal lines. And furthermore, you can depend on SPANG "CW" Steel Pipe for an exceptionally long life in the field.

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NATIONAL BLUE PRODUCTS

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# FogFOAM *puts smothering blanket over flaming liquids*

**Rockwood Nozzle Turns out Perfect Proportions of Foam, Air and Water to put out highly volatile flammable liquids; action is instant**

Just 3 parts of Rockwood Double Strength Foam added to 97 parts of water, and you've a special "mix" that's death to fire.

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**Rockwood Type FFF FogFOAM Nozzle with FogFOAM Screen** available for service on 1½", 2½", 3½" fire hose lines. Nozzles discharge Solid FOAM (with shaper), and High Velocity WaterFOG as well as FogFOAM (with screen). Range of FogFOAM with shaper approximately 60 feet, with screen 30 feet.

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**Rockwood Double Strength Foam** — available in 5 gallon cans or 50 gallon drums. Tested by Underwriters' Laboratories.

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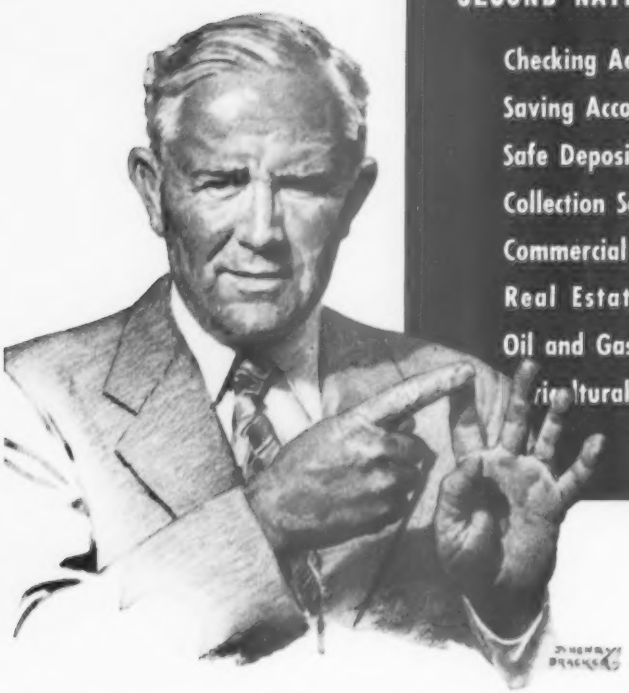

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3. Second National offers a *complete* banking service, and is one of the nation's most highly departmentized banks with specialists in every phase of modern banking at your service.

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*46 Years of Service to the Southwest*

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We've claimed Cat* Oilfield Engines are rated for *honest* HP and KW—that they give you faster work cycles—handle bigger strings of pipe—start fast in any weather—use low-cost No. 2 furnace oil without fouling.

We've claimed that your Caterpillar Dealer backs them up with prompt, on-the-spot service.

We've claimed they will last longer—and do more work with less down time and lower cost than any other unit.

# NOW MAKE US PROVE IT!

Your Caterpillar Dealer is ready to show you facts and figures—take you to engines and electric sets working on the rig—give you a list of owners you can talk to. He's as near as your phone. Call him today!

CATERPILLAR, Peoria, Illinois.

**CATERPILLAR***

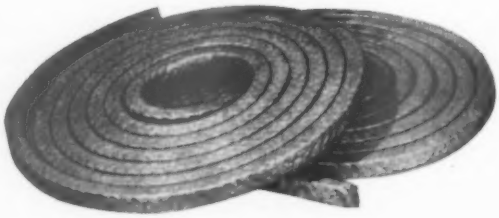
*Both Cat and Caterpillar are registered trademarks—®

**DIESEL ENGINES AND ELECTRIC SETS**

# Key packings from the

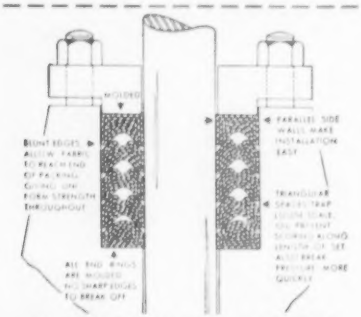
**U. S. SPECIAL REFINERY PACKING**

**Style 251.** Recommended for reciprocating rods handling acid sludge and oils not over 400 degrees F. In coil form this packing makes an excellent filter press gasket. Made with a molded channel composed of layers of high-quality asbestos, frictioned together with a compound highly resistant to liquids encountered in refinery service.



**U. S. CENTRIFUGAL PUMP PACKING**

**Style 193.** For centrifugal pumps, or other rotating or oscillating rods or shafts, handling hot or cold, fresh or salt water, oil, brine, weak acids, caustic solutions and ammonia. High-grade asbestos, thoroughly lubricated and graphited, before braiding, by an exclusive "U.S." process.

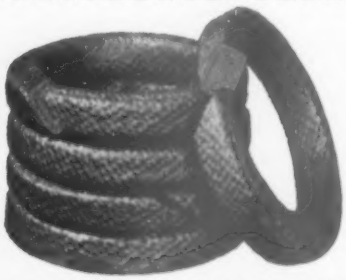


**U. S. MATCHLESS® PACKING**

**Style 16022.** For hydraulic equipment, presses, rams, triplex pumps, outside packed pumps. This is the *high-pressure* packing—will withstand hydraulic pressure as high as 8000 pounds. Its self-adjusting automatic action results in reduced wear and tear on rods and plungers, minimizes friction.

**U. S. BRAIDED CAUSTIC PACKING**

**Styles 126, 136.** For reciprocating and centrifugal pump rods and valve stems handling light caustic and other corrosive solutions. Made from asbestos yarn, thoroughly treated with a special "U.S." caustic-resisting compound, and graphited. Style 126 is made in round cross-section. Style 136 is square cross-section.



**U. S. RAINBESTOS HIGH-PRESSURE ROD AND PLUNGER PACKING**

**Style 101.** For packing reciprocating or oscillating rods and plungers against high-pressure steam, air and gas up to 500 degrees F. Made from selected asbestos cloth, with a genuine U. S. Rainbow non-hardening cushion, formed square, and treated with heat-resisting lubricants and graphite.

**U. S. GASOLINE PUMP PACKING**

**Style 413.** Specially designed for service against cold gasoline, mineral oils and most solvents in service on centrifugal or reciprocating rods and valve stems.

# U. S. Rubber Standardized Chart!

### U. S. COMPRESSED ASBESTOS SHEET

**Style 899.** Recommended for packing flanges or joints against super-heated or saturated steam, air, ammonia, gases, oil, gasoline, water, some acids, alkaline solutions and other chemicals. This is the original oil-proof asbestos fibre high-pressure sheet developed specially for oil industry conditions. Will not soften, burn, blow or ooze out of a joint, and does not deteriorate with age in stock.

### U. S. OIL RESISTING DIAPHRAGM SHEET PACKING

In several styles, made from high-quality cotton fabric and nylon insertions with Neoprene cover stocks impervious to the action of cold oils and gasoline.

**Style P-2901.** Supersensitive sheet, 1/32" thick, 36" wide.

**Style P-2138.** Cotton sheeting insertion, in 36" width only, 1/32" thick and up.

**Style P-2133.** Medium wt. duck insertion, 46" wide, 1/16" thick and over.

**Style P-2904.** Nylon insertion in 40" widths, 1/16" thick and over.

### "U. S." STANDARDIZED PACKING CHART FOR REFINERIES AND GASOLINE PLANTS

**First "U. S." Packing Style Number Listed for Each Condition Is the Best Recommendation for that Particular Service**

| Service | Brine; Water, Cold | Water, Hot | Oil Distillates | Propane and Butane | Oil Up to 400 F. | Oil Over 400 F. | Ammonia | Caustic | Acid |
|---|---|---|---|---|---|---|---|---|---|
| Centrifugal.... | 193 | 193 | 413 | 16193 | 193 | 512 | 193 | Weak 136<br>Strong 293 | 293 |
| Reciprocating Steam End.. | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 |
| Fluid End.... | 16010 | 16010 | 16012<br>251 | 16012<br>251<br>16133 | 16022<br>251 | 16022<br>512 | 133 | 160 2<br>251 | 293 |
| On Piston... | 463 | 453 | 575 | 575 | ... | ... | ... | ... | ... |
| Valve Stem.... | 125 | 125 | 413 | 16193<br>16133 | 125 | 512 | 125 | 125 | 293 |
| Gaskets..... | 9 | 9 | 899 | 899 | 899 | 899 | 9 | 9 | 19069<br>899 |

**Gaskets for:**

Sweetland Press.....8797

Tank Car Gaskets { Bolted Type...1771 / Screw Type...4773

These packings can fill 90% or more of your packing needs for the refinery. All standard sizes and dimensions are obtainable from your supplier's stock or "U. S." District Sales Offices. And for special problems, engineers at any of our 25 branches stand ready to provide packings to fill your requirements.

U.S.RUBBER
SERVING THROUGH SCIENCE

*"U.S." Research perfects it*
*"U.S." Production builds it*
*U.S. Industry depends on it.*

**UNITED STATES RUBBER COMPANY**

**MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.**

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes
Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

# ALL FORGED STEEL

# Edward

## STOP AND CHECK VALVES

## For Pressures Up To 7500 lbs.

**Rated for 7500 lbs. at 125F in 2 in. sizes, and for 6000 lbs. at 125F in the ½ to 1½ in. sizes, Edward's complete line of all forged steel high pressure valves are used in thousands of applications involving excessive pressures and temperatures under 300F. Fig. 158 stop valves, in either globe or angle styles, provide fast, certain shut-off or accurate pressure control. Fig. 160 check valves protect costly equipment, eliminate danger by preventing sudden reversal of flow.**

FIG. 158

### Construction Features Like These Give Longer Life, Reduce Replacement Costs And Lower Maintenance Time:

### FIG. 158 STOP VALVES

- Drop forged steel bodies specially heat treated.
- Stem at 60 degree angle to reduce wear producing turbulence, lower pressure drop.
- Seat, disk, and stem of EValloy 13% chromium stainless steel.
- Renewable screwed in seat with long threads below pressure joint for leak proof seating
- Inside screw construction, deep stuffing box and special gland and packing nut design to lengthen packing life.
- Bonnets EValized by exclusive plating process for maximum corrosion and abrasion resistance.
- Body contours streamlined for free flow with low pressure drop.
- Stem of EValloy stainless steel, centerless ground to fine finish, long wearing Acme form threads, backseating shoulder.

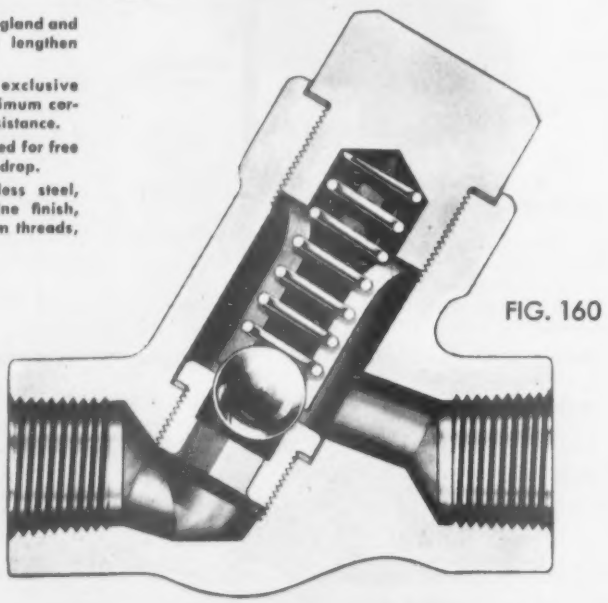


FIG. 160

### FIG. 160 CHECK VALVES

- Body and seats identical with globe or angle valves above.
- Rolled steel bonnet with two ribs for guiding ball to accurate seating.
- Balls of corrosion resistant, high carbon stainless steel accurately ground for tight seating.
- High Carbon stainless steel springs, sufficiently long to provide positive aid in seating ball in services involving heavy viscous fluids.

### *Available In Wide Range of Sizes and Styles*

- Stop valves furnished in globe or angle styles.
- Check valves furnished in horizontal or vertical styles.
- All valve styles furnished in sizes ¼", ⅜", ½", ¾", 1", 1¼", 1½", 2".
- All valve styles furnished with either screwed or socket welding ends.

**Edward builds a complete line of cast and forged steel valves for pressures from 150 lbs. to 7500 lbs., including globe and angle stop valves, gate valves, non-return valves, blow-off valves, feedline stop-check valves, integral bonnet Univalves, relief valves, hydraulic valves, instrument valves, gage valves and strainers. Write for Catalog 104.**

## Edward Valves, Inc.

Subsidiary of ROCKWELL MANUFACTURING COMPANY

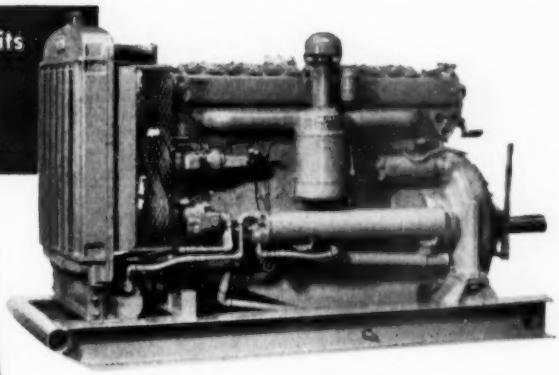
1492 West 145th Street, EAST CHICAGO, INDIANA

Another Product

# Wherever you are

**you will find MURPHY DIESEL**
**sales, parts and service facilities**
**convenient, prompt and dependable**

**Engines and Power Units**
**Generator Sets**
**Mech-Elec Units**
90 to 240 H.P.
60 to 140 K.W.



**Genuine Factory Engineered Parts**
Strategically located stocks of genuine Murphy Diesel parts minimize down time for repair or overhaul

**MURPHY DIESEL COMPANY**
5305 W. Burnham St.
Milwaukee 14, Wisconsin

253

**Factory Trained Service Specialists**
Dealer servicemen are trained in the newest and best service techniques right in the Murphy factory

MURPHY DIESEL

***SEE YOUR MURPHY DIESEL DEALER, TODAY—***

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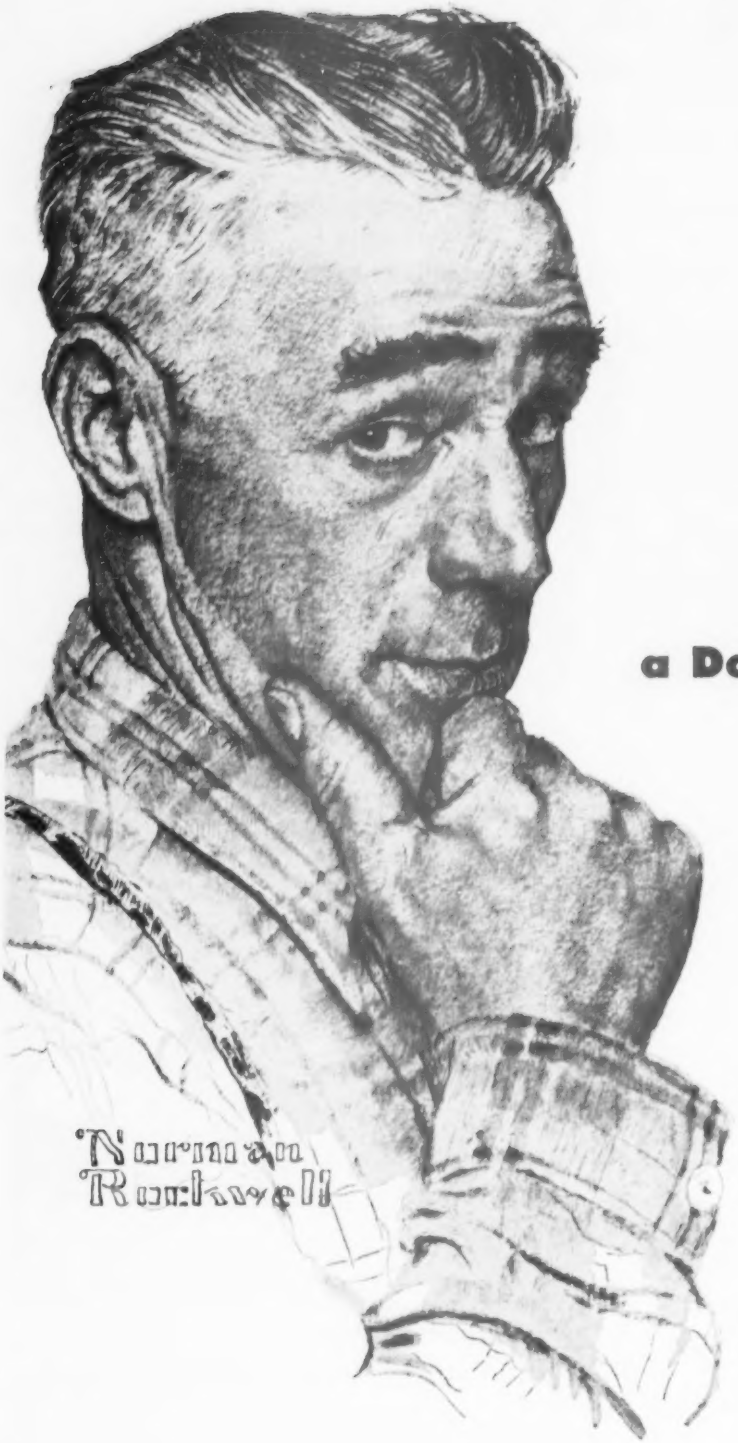
Denver, Colorado
Constructors Equipment Company
Edmonton, Alberta, Canada
Northern Engine & Equipment Co., Ltd.
San Antonio, Texas
J. E. Ingram Equipment Co.
Great Bend, Kansas
Manufacturers Dist. Co.
Great Falls, Montana
Hall-Perry Machinery Company
Houston, Texas
Houston Engine & Pump Co., Inc.
Jackson, Michigan
Utility & Industrial Supply Co.
Los Angeles, California
Industrial Engine Service
Lubbock, Texas
Conley-Lot-Nichols Machinery Co.
Glenn Rose Engine Service
502 South Reed Road
Bakersfield, California

SALES, PARTS AND SERVICE, 115-117 S. ELWOOD STREET, TULSA, OKLAHOMA




# You?...

## a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try... see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the oil fields prefer Roebling rope. Call your nearest Roebling office for a Field Man to suggest the best ropes for your purposes... District Offices at Cleveland, Denver, Houston, Los Angeles, Odessa and Tulsa.

**ROEBLING** CF

A subsidiary of The Colorado Fuel and Iron Corporation

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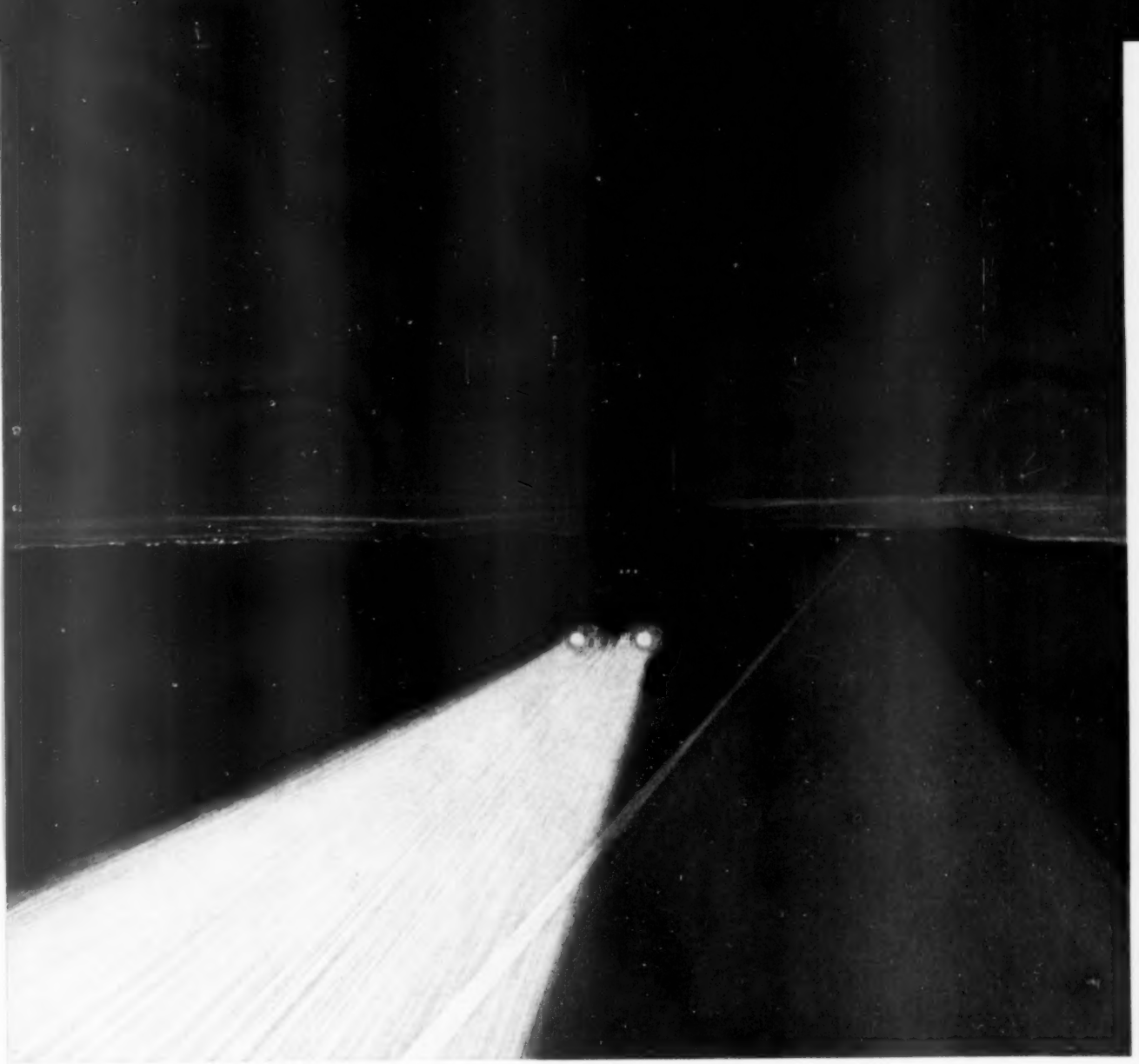


# 100,000,000 miles looking for the answers

When you're looking for the final answers on how an oil or gasoline will affect engine durability, there's only one place to go.

Down the road.

Sometimes it takes millions of road-testing miles to be sure you've got reliable answers. That's why we think it is significant that since 1923 vehicles participating in Ethyl tests have rolled up more than one hundred million research miles.

Today at Ethyl's road-testing centers in Detroit and San Bernardino, both passenger cars and commercial vehicles of every representative type

*(Continued on next page)*

Printed in U.S.A.

## 100,000,000 miles looking for the answers

*(Continued from preceding page)*

are equipped with special test instruments . . . many of them devised by Ethyl research people. Every mile of every test is under the control of experienced engineers and technicians who understand thoroughly the problem of engines, fuels, and lubricants.

On top of this, we get valuable data from passenger car, truck, and bus fleets which cooperate in Ethyl's road-testing program. Every year we obtain information on how their vehicles perform on highways, over mountains, through deserts, under all kinds of tough operating conditions.

And you can be sure they're out on the road today and every day piling up mileage in search of facts that will help you make and sell better petroleum products.

**ETHYL CORPORATION**

NEW YORK 17, NEW YORK

*Ethyl service is backed by 30 years of antiknock experience*

RESEARCH

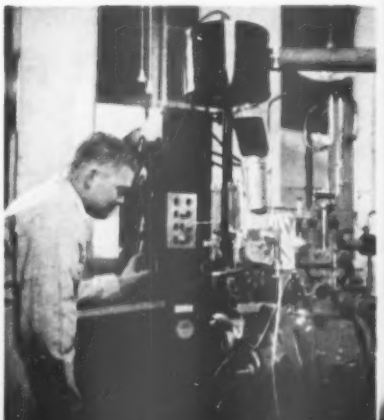
SALES HELPS

FARM SERVICE

ROAD TESTING

SAFETY SERVICE

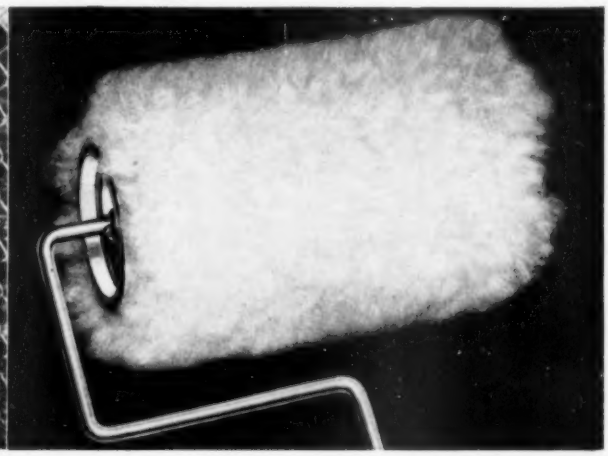
GASOLINE TESTING



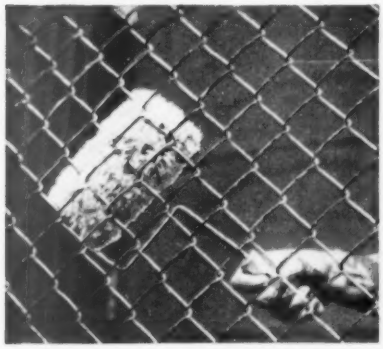
# Cut wire fence re-coating costs!

## Users Report Savings of 30% to 40% With Rust-Oleum Extra-Long Nap Lamb's Wool Roller!

Special roller glides easily over wire sections. (Rusted sections have already been primed with Rust-Oleum 769 Damp-Proof Red Primer to Stop Rust.) Finish coat is Rust-Oleum 470 R.M. Aluminum.

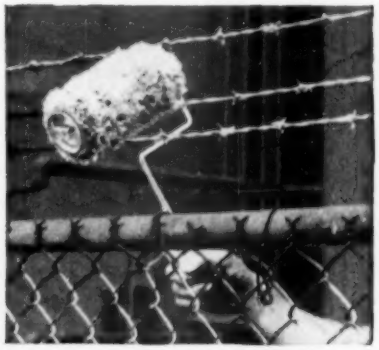


A *new, exclusive, different-type* roller! Greater diameter, specially selected skins, extra-long Lamb's Wool – all combine to give you more coverage faster and easier in the new Rust-Oleum Roller-Coating System.

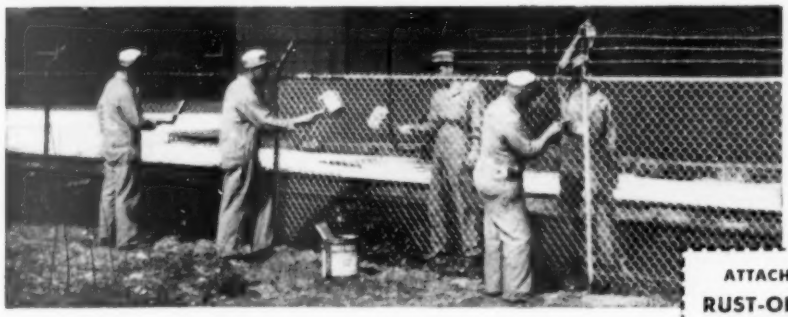


Close-up shows how Extra-Long Nap Wool reaches around to coat approximately 70% of other side of fence at same time. Rust-Oleum's *exclusive* penetrating qualities saturate cross wire sections for desired mil thickness.

Man follows with "dry" roller on opposite side of fence to catch and use surplus "tears" and quickly coat remaining 30% of wire sections.



Even barbed wire sections can be roller-coated in one easy pass. 99% of the material is used on the fence – *not* on the workers, *not* on the ground.



On long distances of fencing, a 5 man production "team" can achieve even greater savings. The first man wirebrushes the surface to remove dirt, dust, rust scale, etc. The second man applies Rust-Oleum liberally by roller, coating the wire sections and barbed wire. The third man follows on the opposite side of the fence with a "dry" roller to catch and use the surplus. The fourth and fifth men work on opposite sides of the fence, brushing the pipe framework and the barbed wire arms. See how this new Rust-Oleum system can save you money. Attach coupon to your letterhead, mail *today*.

**RUST-OLEUM®**

**STOPS RUST!**

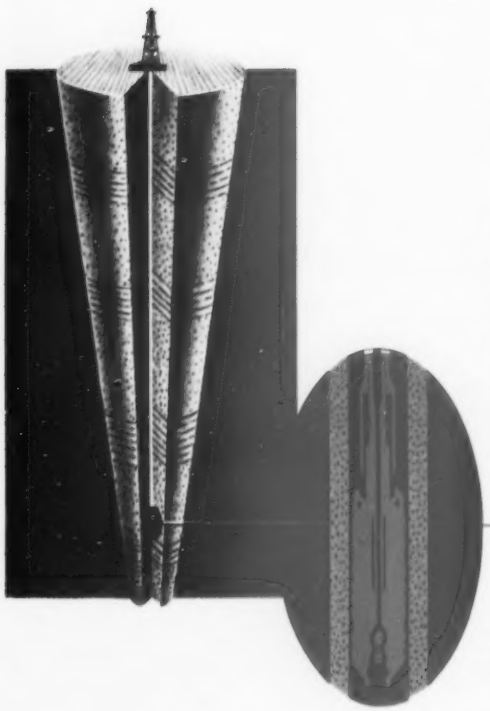
**ATTACH TO YOUR LETTERHEAD — MAIL TODAY!**

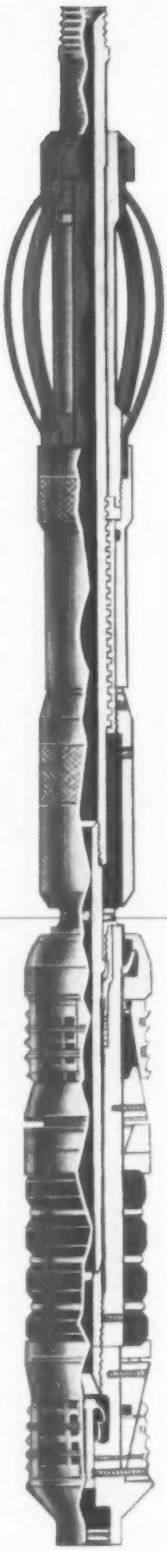
**RUST-OLEUM CORPORATION**
**2543 Oakton Street, Evanston, Illinois**

Please show us how your new Extra-Long Nap Lamb's Wool Roller will cut our wire fence re-coating costs. Include prices, complete literature about Rust-Oleum and nearest source of supply. We have approximately _____ yards of fencing.

# POSITIVE SHUTOFF FOR DEEPHOLE SQUEEZING!

## HALLIBURTON'S DM AND DC SQUEEZE PACKERS





**DM** – drillable magnesium alloy for squeezing and *temporary* Bridge Plugs

**DC** – drillable cast iron for squeezing and *permanent* Bridge Plugs

You get outstanding deephole performance from these dependable Squeeze Packers because they provide positive fluid shutoff from either direction – regardless of well depth or pressure.

Halliburton Squeeze Packers set immediately by simple mechanical action when tubing is rotated to the right. An upward lift on the tubing sets slips, releases back pressure valve to closed position, and expands packing element against the casing to form the perfect seal. A continued upward lift on tubing releases the circulating valve from packer and circulation can be established immediately.

Additional advantages of these Halliburton Squeeze Packers are that tubing and circulation valves are free from packer before squeezing begins. There are no threads to unscrew or get loose from the packer after cement is placed. Too, no strain is taken on tubing while squeezing, which decreases stress and minimizes the danger of tubing being damaged by internal pressure.

After completion, tubing and circulation valve are withdrawn. Excess cement is reversed out, leaving packer to be drilled out or remain in well as a permanent bridge plug. No wonder more operators are using these Squeeze Packers to obtain superior deephole jobs.

Take advantage of these precision-designed packers on your next job. Phone your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

**HALLIBURTON**

YEARS AHEAD IN ADVANCED CEMENTING TECHNIQUES!

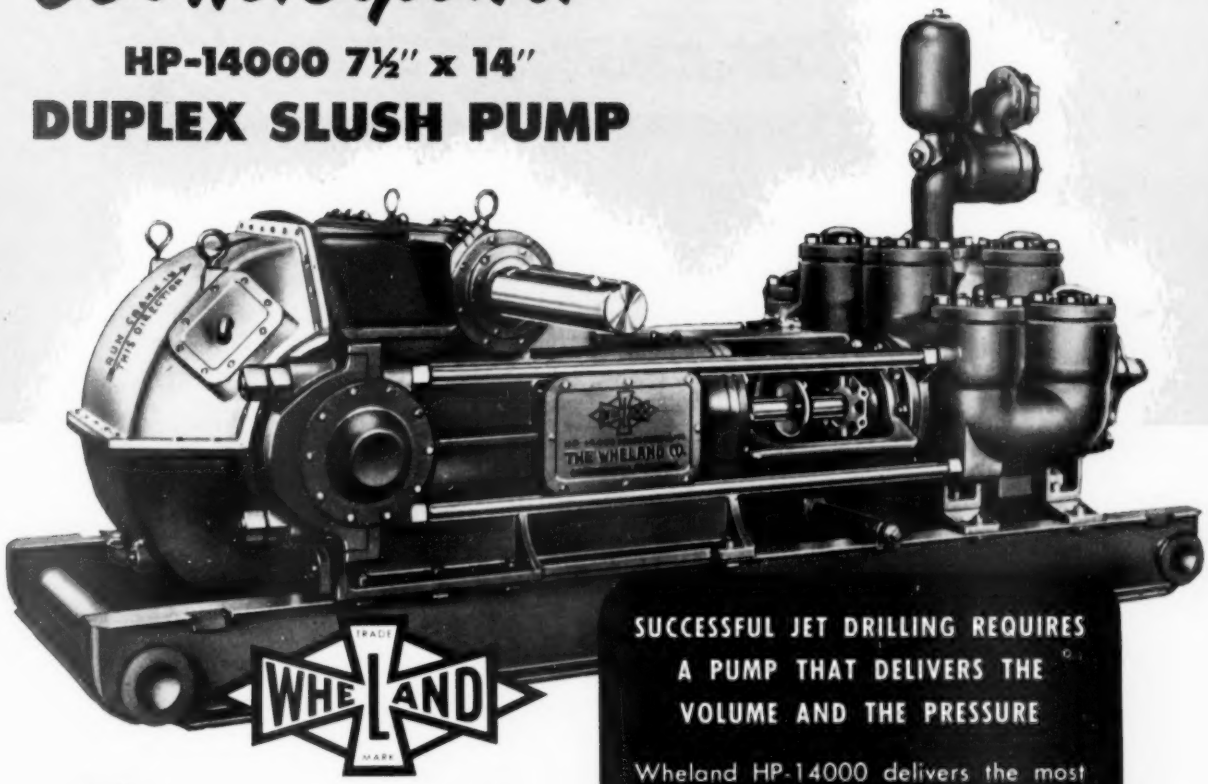
# WHELAND

## 350 Horsepower

**HP-14000 7½" x 14"**

**DUPLEX SLUSH PUMP**

***Thoroughly proved by years of operation on hundreds of wells in many fields.***




## *the pump for*

## JET DRILLING!

**DATA SHEETS**

*Compiled from actual performance of jet drilling with the Wheland HP-14000 are available on request.*

**SUCCESSFUL JET DRILLING REQUIRES A PUMP THAT DELIVERS THE VOLUME AND THE PRESSURE**

Wheland HP-14000 delivers the most pressure per pound of pump, and provides the best balance of pressure and volume for effective jet drilling. This is the pump for jet drilling . . . and the best pump for jet drilling is the best pump for *any* drilling.

Like any pump used on jet drilling, this pump must be fitted with proper size liner and run at correct speed and pressure in relation to:

1. Size, condition and depth of hole.
2. Type and size of drill pipe, drill collars and jets in bit.

# WHELAND

**THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.**

***ROTARY DRILLING MACHINERY***

**DOMESTIC DISTRIBUTORS**

Jones & Laughlin Steel Corporation Supply Division Tulsa, Oklahoma Stores and Offices in all Principal Oil Fields and Centers

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DRAW WORKS • SLUSH PUMPS • ROTARIES • SWIVELS • CROWN BLOCKS • TRAVELING BLOCKS

# NEW MASONEILAN 12000 SERIES

## Offer Accurate, Sensitive,

## *New Ease of Selection;*

Proportional Controller

Proportional-Reset Controller

**These new controllers reflect a realistic blending of past experience and current design trends, combining advanced features which reduce weight, improve adjustability and increase ease of selection, installation and servicing.**

*Consider what these design improvements can mean to you . . .*

**UNIT CONSTRUCTION**

Unit subassemblies of the control mechanisms (proportional, or proportional-reset, unit and level setting mechanism) are mounted on the mechanism bracket which is in turn rigidly attached, piloted and doweled to the torque tube housing. Thus, individual units are fixed in position, unaffected by possible distortion of the case, yet are readily removable for servicing or interchange. Other sub-assemblies (pilot and manifold) are mounted in the rugged aluminum case which is finished and gasketed for outdoor service. Cover is closed by a positive cam-type latch.

**SIMPLE AIR CIRCUITS**

The high-capacity, balanced, amplifying, pilot with frictionless floating-action valve and cleanable sapphire orifice, is connected to the forged brass manifold which contains most air passages. Tubing in the proportional controller is limited to two short lines. The nozzle is easily removable for cleaning, and after replacement requires no aligning. Special ring type adapters facilitate connections.

**EASE OF ADJUSTMENT**

*Proportional band setting . . .* is made on a rod-type cantilever spring by a self-aligning clamp tightened by a large knurled knob located in front of the mechanism. A four-inch direct reading scale indicates the setting.

*Control action and specific gravity setting . . .* are selected by attaching the control link to desired side of reversing arc along the specific gravity scale, graduated from 0.5 to 1.4. The arc is easily reversible when instrument mounting is changed to opposite side of displacer.

*Set point . . .* is precisely adjustable throughout entire range by turning setting knob over 270° arc scale, 2″ long. Scale is reversible when control action is changed.

*Direct level indication . . .* is provided by a sturdy pointer fastened directly to the torque tube rod. The scale is graduated for both left and right hand instrument mounting and for several specific gravities.

## FOR A WIDE VARIETY OF APPLICATIONS

# LIQUID LEVEL CONTROLLERS . . .

## Dependable Control – plus

## *Adjustment and Servicing*

Top and bottom connections — integral chamber

Side and bottom (or side and side or side and top) connections — two-piece chamber (to permit field orientation of instrument)

*Alignment micrometer* . . . is sturdily mounted, is readily accessible and permits adjustments with minimum disturbance.

**VERSATILITY**

*The proportional controller* . . . may be used as a *Transmitter* and can be converted in the field to a

*Differential gap controller* . . . by simply reversing position of the coil spring and bellows in the proportional unit; or

*Proportional-reset controller* . . . by interchanging the proportional unit and the proportional-reset unit.

**STURDY, COMPACT, ACCURATE MEASURING UNIT**

All parts of the *Torque Tube Assembly* are made of a single alloy, individual parts being welded to form an integral unit. Knife-edge bearings support both ends of torque tube. Torque tube housing is removable from mechanism chamber.

*Stainless* . . . steel tubing *Displacers* designed so that standard control mechanism can be used for all ranges, are attached to the torque arm by hangers with modified-knife-edge hooks. Hanger extensions may be integral or detachable.

*Chamber* . . . assemblies are compact and light in weight to facilitate handling and installation. Mounting dimensions are uniform for all materials and ratings — and are in whole numbers; on side-mounted types mounting dimensions equal level range.

**VARIETY OF TYPES, MOUNTINGS, MATERIALS**

*Instrument Types* include *Proportional, Proportional-reset, Differential Gap Controllers* and *Transmitters;* or any combination of two of these in larger case. *Mounting Types* include top and bottom, side and side or side and either top or bottom, with screwed or flanged connections; also top or side of vessel with flanged connections. Instrument mounting left or right of displacer.

*Ratings* up to 2500 lbs. ASA.

*Materials* include iron (14″ & 32″ only), steel or alloy chambers; stainless steel displacers; inconel (or wide selection of other materials) torque tube assemblies.

*Ranges* — 14″, 32″, 48″, 60″, 72″, 84″, 96″, 120″

*Complete details sent on request. Address*

ALL HIGH Quality Coefficient PRODUCTS

## MASON-NEILAN REGULATOR CO.

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**IN THE PROCESS INDUSTRIES**

# Look What's Back of FLYING HORSEPOWER!

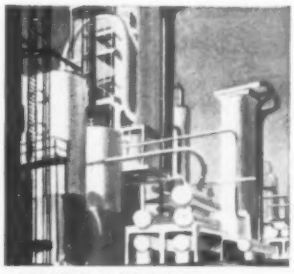
GEOLOGISTS

CONSTRUCTION WORKERS

THE PICTURES on this page depict the many vital operations necessary to produce and deliver the high-quality gasoline that modern car engines require. Exploration, drilling, refining, transportation, marketing—all these activities demand highly specialized skills, an army of workers. And these skills and workers must be fused into an efficient team if the price of gasoline is to remain low.

The Makers of Mobilgas, along with the entire petroleum industry, are proud that *today's gasoline does 50 per cent more work—yet costs no more (before taxes)—than the gasoline of 25 years ago!*

DRILLERS



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# 2 New WIRE ROPES..

Jones & Laughlin Steel Corporation
Supply Division
P. O. Drawer 2481
Tulsa, Oklahoma

SEND COMPLETE INFORMATION

- ☐ J&L SpringKore — For Rotary Drilling
- ☐ J&L's PlastiKore — For Cable Tool Drilling

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***. . . AS INTRODUCED AT THE TULSA OIL SHOW***

## J&L STEEL SpringKore . . .
### . . . For Rotary Drilling

J&L SpringKore is a new line for rotary drilling, made around a tightly coiled spring packed with lubricant. It fulfills a demand for a wire rope that resists crushing. Field tested. Highly successful. Mail the coupon or call your J&L store now.

## J&L's PlastiKore . . .
### . . . For Cable Tool Drilling

J&L PlastiKore is a new line designed for cable tool drilling. This core resists moisture, acids, caustics, and other destructive substances. It is uniform and supplies a firm, permanent cushion. Field tests under trying conditions have proved PlastiKore a premium product. Mail the coupon or phone your J&L store today.

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# CHEVROLET ADVANCE-DESIGN TRUCKS

## More work per dollar ... and here are 4 powerful reasons why!

**MORE POWER AT LOWER COST!** Watch costs go down when you put the new heavy-duty power of Chevrolet's advanced Loadmaster engine to work! The new high-compression ratio of 7.1 to 1 in this great engine brings you more power and even greater economy than before. Chevrolet's Thriftmaster engine, too, in light- and medium-duty models offers exceptional economy of operation.

**FACTORY-MATCHED TO THE JOB!** Some jobs demand more power. Some demand stronger springs. But, *whatever* the requirements of your job, Chevrolet trucks are carefully *factory-matched* to the work to be done, with the *right* power—and the *right* units from tires to axle, springs to clutch—to handle that work at lowest cost.

**MORE RUGGED THAN EVER!** There is extra economy, too, in the exceptional stamina of Chevrolet trucks. You can expect new ruggedness and strength with heavier, more rigid frames and brawnier construction throughout. You can expect extra miles added to the life of your truck, plus a substantial reduction in the over-all cost of hauling.

**LOWEST PRICED LINE!** Chevrolet trucks are known for qualities and features matched by no other trucks. Yet, with all these advantages, the Chevrolet line lists for less than any other trucks of comparable size and specifications. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

### CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

**TWO GREAT VALVE-IN-HEAD ENGINES**—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET

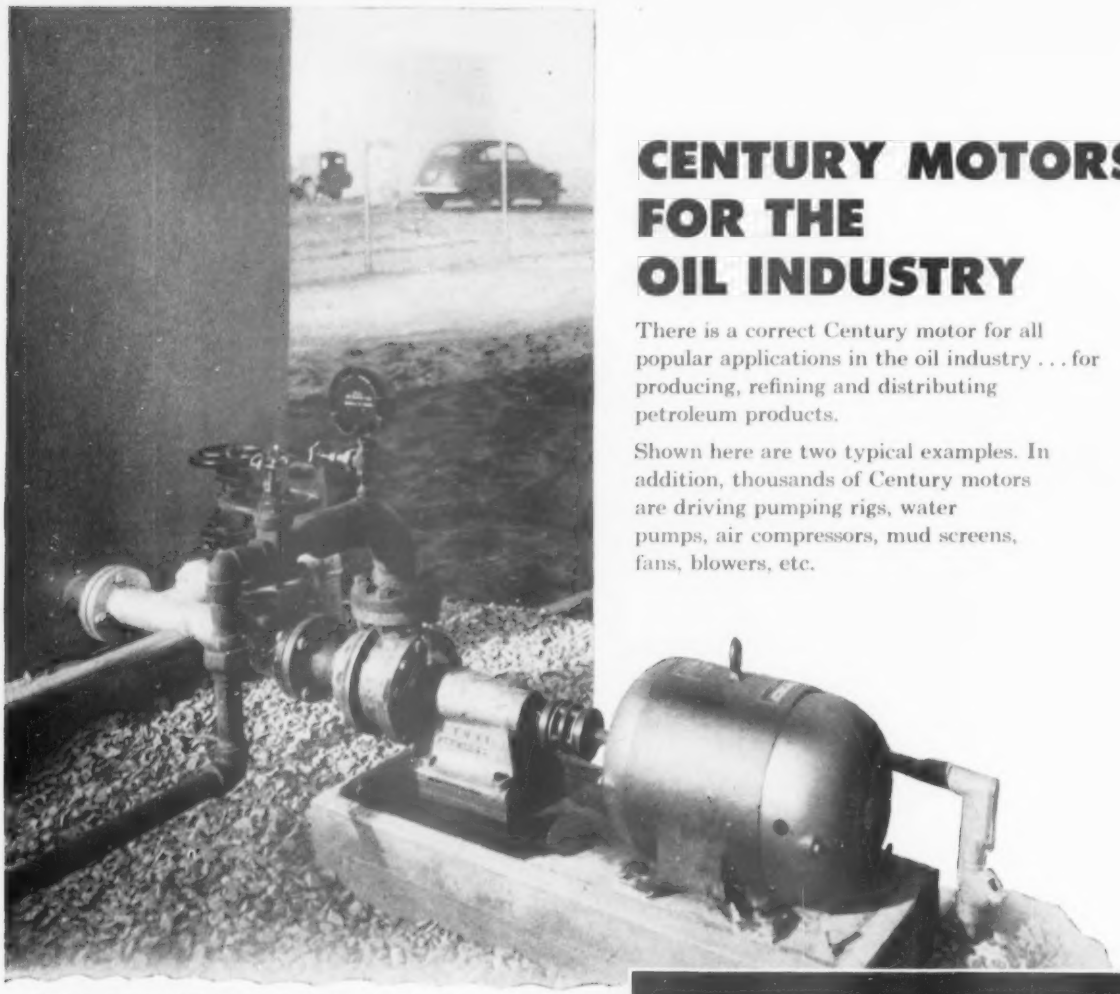
first in demand in value in sales

# *Kobe for Better Pumping*

*"Best proof of the superiority of Kobe Free Pumping is the steadily increasing number of Kobe installations in every Major United States oil producing area."*

FREE PUMP
KOBE

**KOBE INC. Division of Dresser Equipment Co.**
HUNTINGTON PARK, CALIFORNIA – OKLAHOMA CITY, OKLAHOMA



7½ horsepower Century explosion proof motor driving an oil pump.

# CENTURY MOTORS FOR THE OIL INDUSTRY

There is a correct Century motor for all popular applications in the oil industry . . . for producing, refining and distributing petroleum products.

Shown here are two typical examples. In addition, thousands of Century motors are driving pumping rigs, water pumps, air compressors, mud screens, fans, blowers, etc.

Century

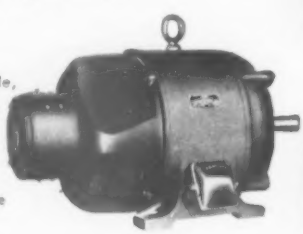
**Splash Proof motors** are scientifically designed to keep dripping and splashing liquids out of the vital parts of the motor. They assure dependable operation on outdoor installations, regardless of rain, snow, sleet or ice.

From Century's wide range of types and kinds of motors in sizes from ⅛ to 400 horsepower, you can select the ones best suited to your applications. Specify Century motors for all your electric power requirements.

*See your supply store for complete information.*

## CENTURY GENERATORS

Where public service current is not available, Century Generators will provide adequate, continuous electric power. Depending on the load per motor and the size of generator, from 10 to 30 wells can be operated from one generator. They provide a dependable source of oil field power.



## ASSURE STEADY ECONOMICAL POWER

25 horsepower Century multi-speed splash proof motor driving a fan on a jacket water cooler in a refinery.

CE-775

**CENTURY ELECTRIC COMPANY**

1806 Pine St., St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

## They call it

# "THE LEAK-PROOF FLEET"—

## It's equipped with Rockwood Ball Valves

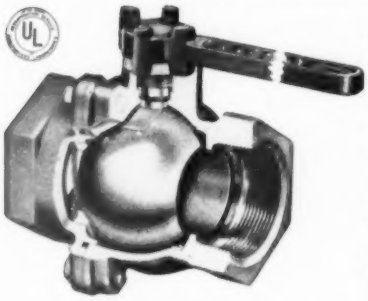
Carrying bottle gas in bulk over city streets is ticklish business.

But this large Transport Company made one decision and stopped a thousand worries. They equipped the fleet throughout with Rockwood Ball Valves. Not even the bumps of rough pavements or the jolts of quick stops and starts unseat these close-fitting valves.

Best part of it is, Rockwood Valves *stay* leak-proof. They resist wear, yet retain the quick-opening and closing features. They require no maintenance.

Rockwood Ball Valves handling "bottled gas" are operated every two minutes during the day. Tight seal makes them real production boosters and cost cutters.

### WHAT YOU WANT . . . ROCKWOOD HAS



*Tested by Underwriters' Laboratories, Inc.*

**Full Round Flow,** with no change in shape or volume of the fluid and no turbulence. Minimum friction loss.

**Quick Operation** in opening and closing means faster loading and unloading.

**Long Life,** because made to resist abrasion and wear.

**Low Maintenance** because engineered to stand up under an anticipated daily grind.

Get complete details on this great new advancement in valve engineering. Send for booklet.

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Send me illustrated folder V-4 on Rockwood Full-Flow Ball Valves.

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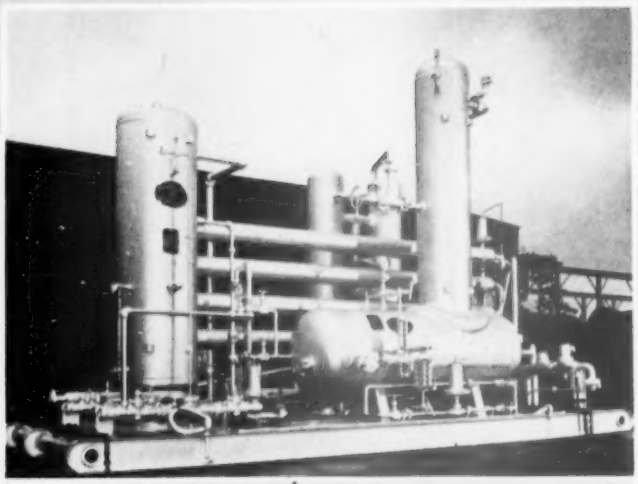
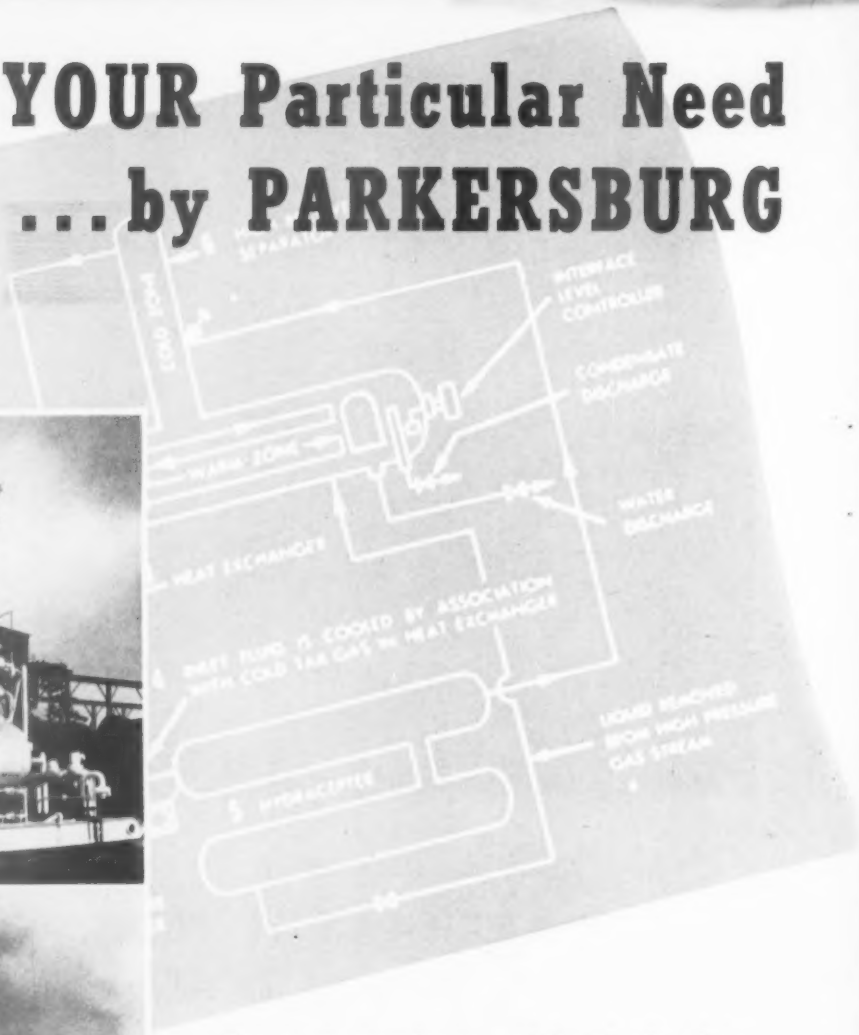
City .....
Zone ..... State .....

**ROCKWOOD *FULL-FLOW* BALL VALVES**

**THE FLOW IS AS ROUND AS THE PIPE ITSELF**

# Designed for YOUR Particular Need ...by PARKERSBURG






• Years of experience and hundreds of installations have proved to us that maximum benefits of cold separation are possible only when the installation is fitted to specific well conditions.

At Parkersburg our engineers, specialists in cold separation, correlate and analyze all the factors presented by your well. From this data they combine the standard elements of Hyreco cold separation units into the one assembly that delivers maximum efficiency on your well. Only Parkersburg's wide range of Hyrecos provides the extreme flexibility which makes this individual installation designing possible.

Call on your Parkersburg Representative for the Hyreco Gas Processing Unit that is designed specifically for your cold separation conditions.

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**PROTECT YOUR PRODUCTION**

**WITH**

**HARPER**

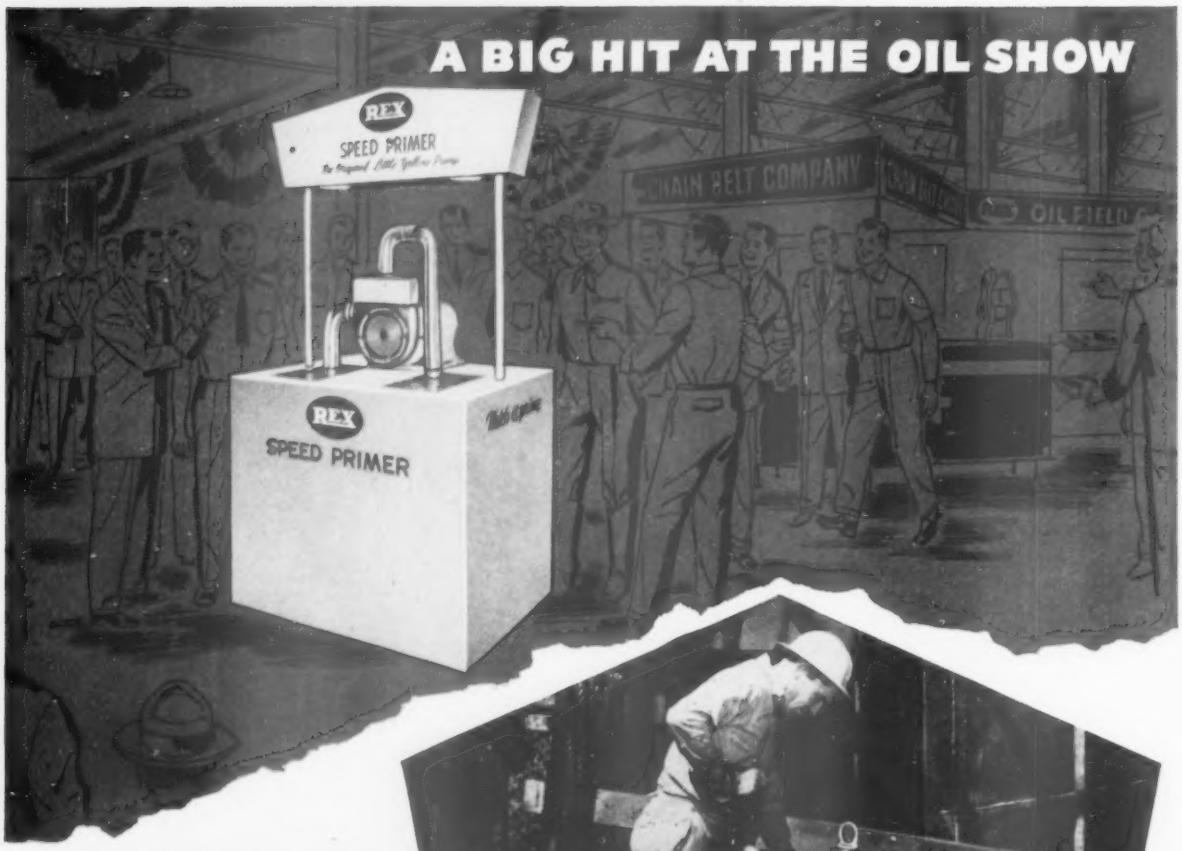
# *corrosion-resistant fastenings*

At the refinery or in the field, the bolts, nuts and screws upon which the satisfactory performance of all equipment depends are constantly subject to that arch enemy of metal—corrosion.

Harper Fastenings resist corrosion—corrosion caused by natural weathering—by salt spray—by sour crudes—by caustic solutions. Today, Harper is the largest exclusive producer of fastenings of such corrosion-resistant metals as brass, silicon bronze, naval bronze, Monel, nickel, copper and all stainless steels—over 7,000 different items carried in stock.

Harper metallurgists are ready to assist you in solving any tough corrosion problem you may be facing. Harper engineers will gladly work with you on the development of special fastenings to assure simplified manufacture or improved equipment. For information on fastenings, see your Harper Branch or Distributor.

THE H. M. HARPER COMPANY
8208 Lehigh Avenue, Morton Grove, Illinois




# A BIGGER HIT IN THE FIELD!

The Rex Self-Priming Centrifugal Pump was the real "hit" at the Tulsa Oil Show. Thousands visited the Rex Booth...saw a plastic model of the Rex Speed-Primer in action...saw exactly how this pump actually primes itself...how it handles water, oil or other liquid regardless of the amount of air in the suction line.

You'll want to join the many thousands who are putting this great pump to work for them in the field. Whether salvaging oil from a slush pit...removing water from the fire-wall embankment around storage tanks ...transferring oil...dewatering around a drilling location...or any one of many other "odd jobs"...your Rex Speed-Primer is always on the job, delivering a great performance. Our new Pump Bulletin No. 53-37, contains all the details on this outstanding pump. Write for it today. Chain Belt Company, 4619 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY ®

**Chain Belt** COMPANY OF MILWAUKEE

**OIL FIELD SALES OFFICES**

**New York • Tulsa • Dallas • Houston • Midland • Los Angeles**

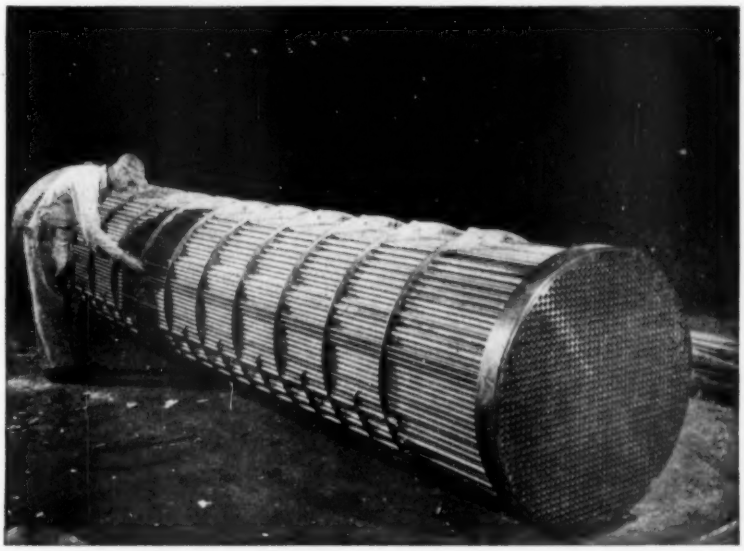
*"Sold in leading supply stores throughout the oil country."*

# PROCESS EQUIPMENT NEWS

PUBLISHED BY FABRICATED PRODUCTS DIVISION, THE M. W. KELLOGG COMPANY JULY 1953

## Exchanger Shops Altered to Handle Increased Demands of Chemical Industry . . .

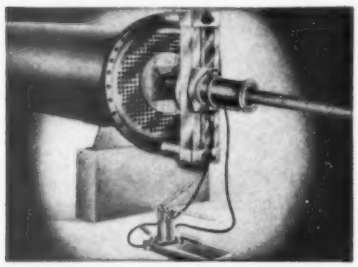
For many years, Kellogg's Exchanger Fabricating Shops in Jersey City concentrated on supplying exchangers for Kellogg's many refinery construction jobs and for making critical exchangers for specific outside customers. However, during World War II the facilities were expanded to produce exchangers for a host of marine and general chemical applications, as well as to handle business from other contractors. Since then this general demand has continued to increase . . . and the Shops have just been rearranged to insure prompt deliveries.



## Nearly 200 Stainless Exchangers Completed in Less Than 18 Months

This stainless steel tube bundle, being inspected prior to insertion in its stainless-clad shell, is one of 187 such exchangers recently completed by Kellogg for a huge new chemical plant. The last unit was shipped less than 18 months after the order was received.

While there were minor variations in designs, the illustrated unit is typical of the exchangers involved. Carrying twenty foot long tubes and measuring almost 48 inches in diameter, it will handle highly corrosive materials. The tubes are of type 316 stainless and the tube sheets and baffles are of type 304. The shell is stainless-clad



## Hydro-Ejector Operates in Number of Refineries

Shown here is the new Kellogg portable Hydro-ejector now in use by a number of refiners and chemical plant operators. The Hydro-ejector removes and inserts the largest bundles with ease . . . eliminates costly steel work to support conventional methods.

For further information, details of method, etc. contact

FABRICATED PRODUCTS DIVISION
THE
M. W. KELLOGG
COMPANY
225 Broadway, New York 7, N. Y.
or offices in Jersey City, Buffalo, Los Angeles, Tulsa, Houston, Toronto, London & Paris

KELLOGG PULLMAN

## Condenser Bundles Prove Precision Line-Up of Tube Sheets and Baffles Essential

Undesirable stresses can readily be built-into any exchanger during fabrication if tubes do not slide through baffles and into tube sheets with ease.

Only with precision line-up prior to inserting tubes is it possible to insure that the tubes will enter the bundle without use of excessive force.

Kellogg's close tolerance machining of tube holes and painstaking line-up make the insertion of tubes a relatively easy task in the fabrication of this propane condenser bundle. When complete it will contain 889 admiralty tubes. Baffles are of naval brass and approximately 33" in diameter.

# the ABC's of PELTON

## LONG STROKE HYDRAULIC PUMPING

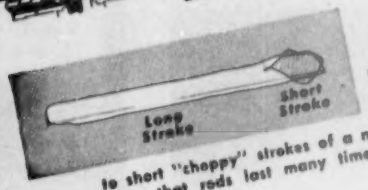
Hundreds of new Pelton Long Stroke Units mark oil field horizons today. Here are results typical of many installations: On an 8100 ft. well previously producing 400 B/D with a 108" beam pumper, our 30 ft. stroke unit on the same well produced 925 B/D. You can expect similar results from your wells which have sufficient potential.

Simple as ABC are the operating principles outlined below. Pelton, engineers in hydraulics for over 73 years have applied proven hydraulic principles to oil well pumping equipment with outstanding success. There's a Pelton Unit for every application, from 8 to 30 ft. stroke, from 10,000 to 40,000 pounds polished rod load. Write today for our engineering recommendations.

**1** Like the hydraulic elevator the Pelton Unit utilizes the principle of the hydraulic ram to achieve enormous power.

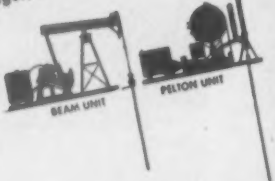
Pelton utilizes time-proven sucker rods **2** to actuate bottom hole plunger pump.

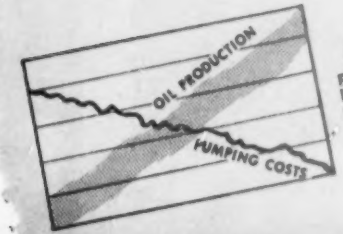
**3** Positive displacement circulating pump delivers hydraulic fluid within a closed cycle system from balance tank to power piston and return. Assures constant polished rod velocity and low sucker rod fatigue stresses.




**4** Dynagraph cards illustrate smooth, continuous and uniform loading on sucker rods compared to short "choppy" strokes of a mechanical unit. Field records show that rods last many times longer.

Production increased by **5** longer strokes and by minimizing effect of rod stretch.




**6** Oil production rises while pumping costs drop. Many Pelton Long Stroke Hydraulic Pumping Units pay out in 3 to 9 months.

# PELTON

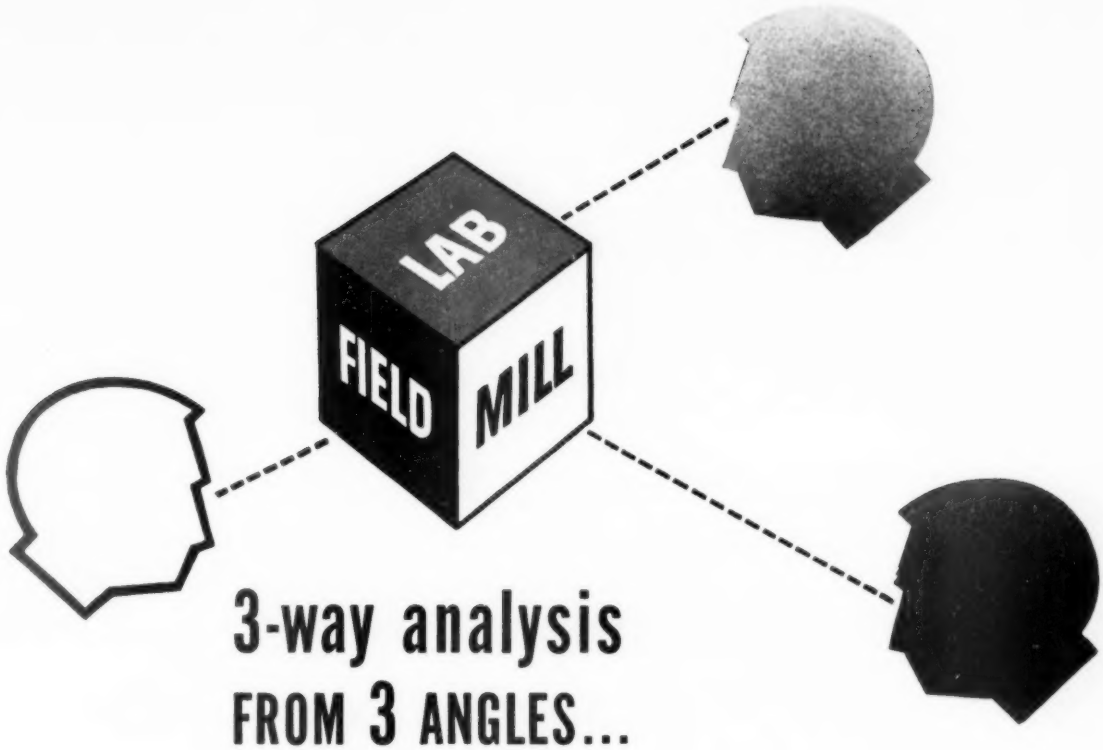
## WATER WHEEL COMPANY

*Subsidiary of Baldwin-Lima-Hamilton Corp.*
*Oil Industry Machinery Division*

2447 East 54th Street, Los Angeles 58, California

In Tulsa, San Francisco, Kansas City, Houston, Dallas, New York City

*Pioneers in hydraulic pumping equipment for the oil industry.*




# 3-way analysis FROM 3 ANGLES...

# to gain 3 benefits...

● Republic's Three-Dimension Metallurgical Service begins with an examination of your production problem by one of our field metallurgists. Along with the mill and laboratory metallurgists, he makes a diagnosis. These three then pool their knowledge of alloy steels, heat-treatment and machining . . . and come up with a prescription that's suitable . . . efficient . . . and keeps within or below your cost limits. The result? Higher quality . . . greater output . . . and economy. If you can use these advantages, call in Republic:

**REPUBLIC STEEL CORPORATION**
*Alloy Steel Division • Massillon, Ohio*
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REPUBLIC STEEL

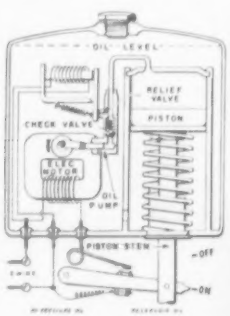
*Republic* **ALLOY STEELS**

**Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing**

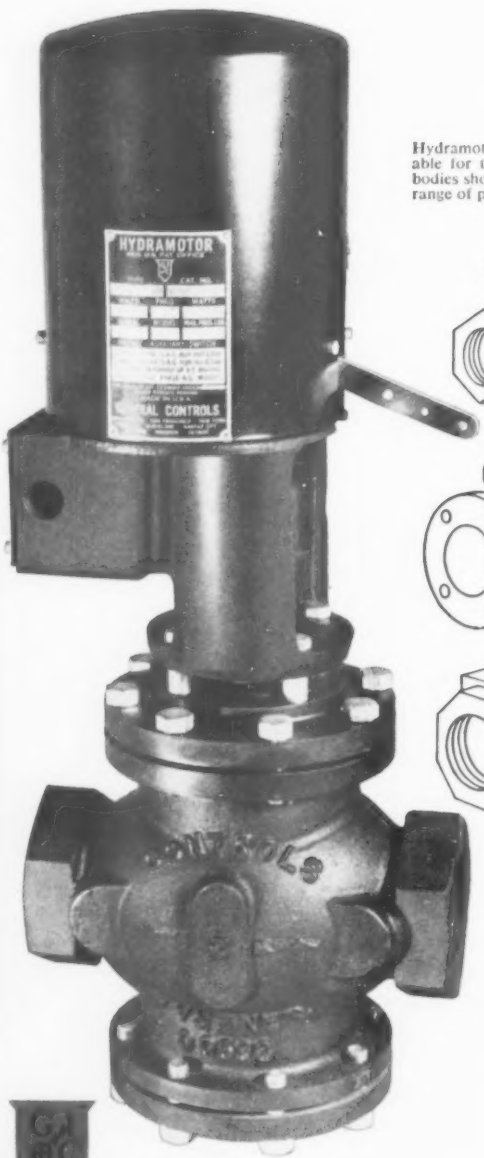
# *The motor valve for every industrial need*

# HYDRAMOTOR*

Featuring two-wire, positive, automatic shut-off in case of current failure, General Controls' Hydramotor* Valves perform dependably under all kinds of pressure, temperature and flow conditions. Lifetime-sealed in oil against dust, grit and weather, the Hydramotor operating mechanism applies electro-hydraulic power direct to the valve, thus eliminating the need for a complicated gear train. With only three moving parts, General Controls' Hydramotor* Valves require no lubrication or maintenance. For safe, economical, all-weather control of gases, oils, steam and heavy viscous liquids, the *best* valve is a General Controls Hydramotor.*

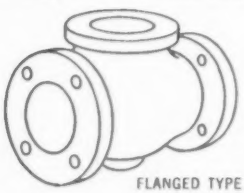



There are no gears in the Hydramotor* operator mechanism. A motor-driven hydraulic pump actuates a piston in a control cylinder, moving the main valve with maximum mechanical efficiency. Valve will handle line pressure up to 3000 psi.

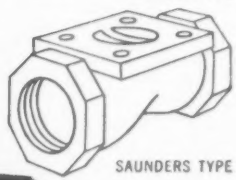



Hydramotor operators are available for the basic types of valve bodies shown below with complete range of pipe sizes from ⅜" to 6"

SCREWED TYPE



FLANGED TYPE



SAUNDERS TYPE

General Controls

*G* series

*Hydramotor Valves*

**GENERAL CONTROLS**

**Glendale, California • Skokie, Illinois**

Manufacturers of Automatic Pressure, Temperature, Level and Flow Controls for Heating, Home Appliances, Refrigeration, Industrial and Aircraft Applications.

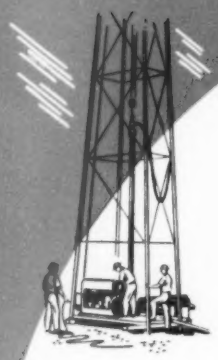
**FACTORY BRANCHES IN 34 PRINCIPAL CITIES**

*See your classified telephone directory.*

**Hydramotor is a registered tradename.*

# How Layne assures your water supply

## UNDIVIDED LAYNE RESPONSIBILITY MEANS COMPLETE SERVICE, LOWER COSTS

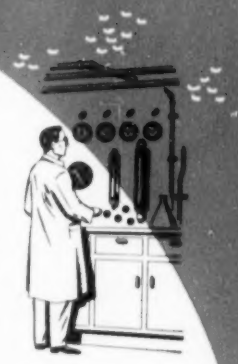


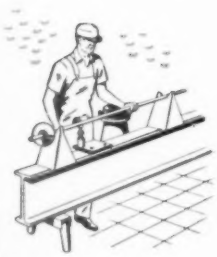
**Layne surveys and test wells**

Layne's *complete* service begins long before the wells are drilled . . . with geological surveys made in cooperation with engineers of the client company or municipality. Test-hole drilling shows actual conditions.

**Layne analyses and recommendations**

Samples taken from the test holes go to Layne's central laboratories, where technicians report on the earth structure and qualities of the water. From these reports, water-system recommendations are made.



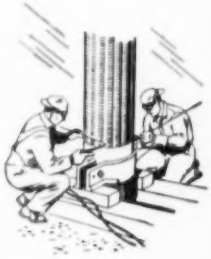


**Layne-engineered pumps, screens, casings**

Into every Layne well goes equipment designed for the specific job—the finest equipment, produced with the greatest economy, because of Layne's thorough engineering skill and world-wide experience.

**Layne installation and maintenance service**

Skilled Layne workmen handle every stage of the job—assuring a system custom-engineered for your own situation. And Layne's experience is always at your service for any maintenance work you may need.



## Let Layne help you plan ahead on your water needs

Layne welcomes the opportunity to share in long-range planning for your water-supply needs. For information on any phase of well water supply or pump equipment, contact your nearest Layne Associate Company or write Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

**WATER WELLS • VERTICAL TURBINE PUMPS**
**WATER TREATMENT**

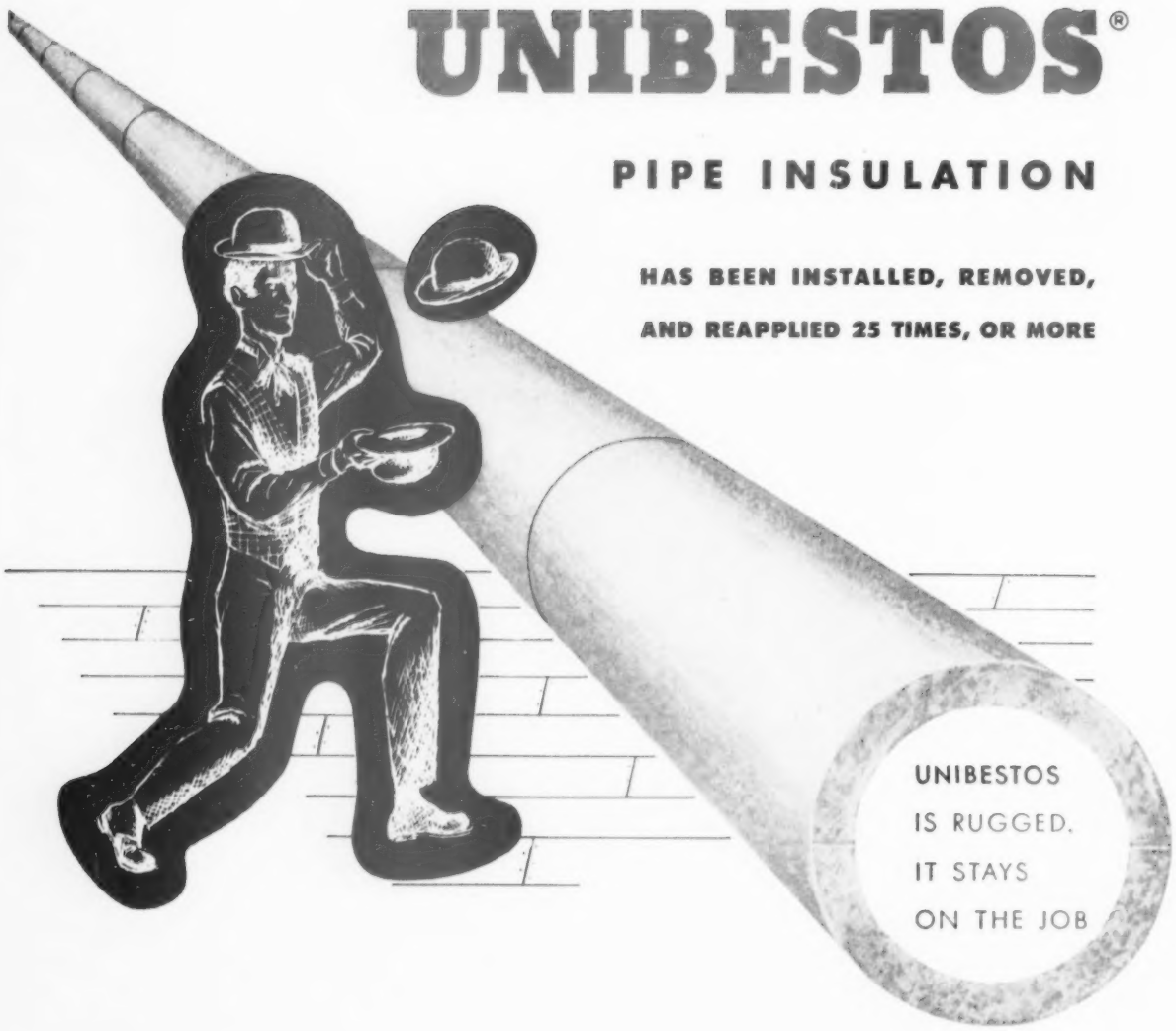
*Layne Associate Companies Throughout the World*

# On again!
# Off again!

## UNIBESTOS®

### PIPE INSULATION

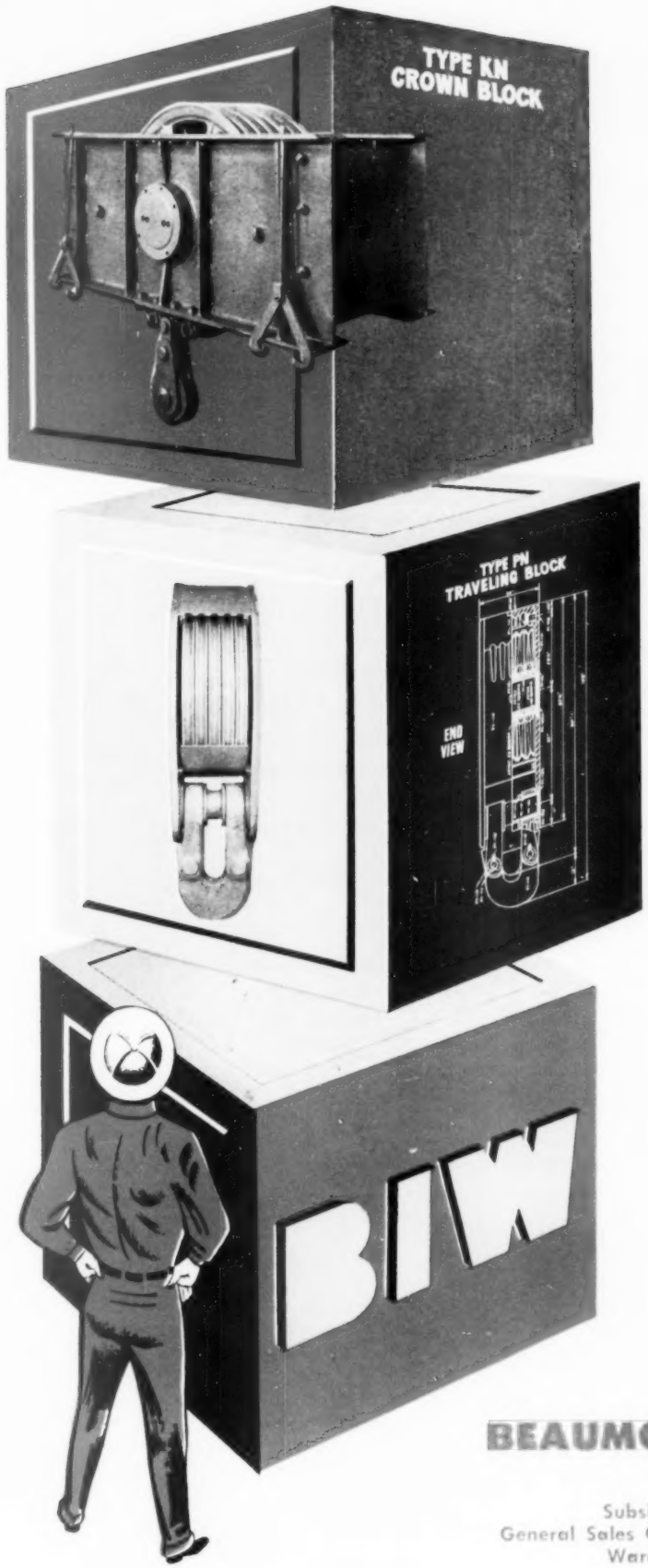
**HAS BEEN INSTALLED, REMOVED,**
**AND REAPPLIED 25 TIMES, OR MORE**




UNARCO

**UNION ASBESTOS & RUBBER COMPANY**

DEPT. E-7, 332 SOUTH MICHIGAN AVENUE, CHICAGO 4, ILLINOIS




# BIW BLOCKS

## BUILD GREATER DRILLING EFFICIENCY!

New, two way bearings on the Type KN Crown Block and the Type PN Traveling Block handle both radial and thrust loads as pure right angle loads. This design increases bearing capacity, reduces weight and cuts space requirements, resulting in longer bearing life, reduced maintenance and lower replacement cost.

The Crown Block can be hoisted through the water table in one piece. Because the center pin is on the center line of the beam, either flange of the beam can be set on the water table beams. The narrow width of the 300 ton capacity Traveling Block permits maximum pipe racking for deep drilling. With its low center of gravity, kicking or side lift is kept to a minimum. Bearings and sheaves are interchangeable between Crown and Traveling Blocks.

Write for the complete story on what these blocks can do to cut your drilling costs, increase your drilling efficiency. Beaumont Iron Works, one of the oldest oil country manufacturers, builds a complete line of drilling and producing equipment.

**BEAUMONT IRON WORKS CO.**

**Beaumont, Texas**

Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St., Houston 19, Texas
Warehouses in Beaumont and Odessa

# GLOBE

specialization gives you
"Tops in Quality"

# ALLOY STEEL TUBES

**SEAMLESS — MECHANICAL — PRESSURE — CORROSION RESISTANT**

**TYPICAL ANALYSES:**

| | |
|---|---|
| Carbon | 5 Chrome ½ Moly |
| Carbon ½ Moly | 7 Chrome ½ Moly |
| ½ Chrome ½ Moly | 8 Chrome ½ Moly |
| 1 Chrome ½ Moly | 8 Chrome 1 Moly |
| 1¼ Chrome ½ Moly | 9 Chrome 1 Moly |
| 2 Chrome ½ Moly | 3% Nickel 7% Nickel |
| 2¼ Chrome 1 Moly | 5% Nickel 9% Nickel |

AISI Types: 304-321-347-316-309-310-405-410-430-443-446

Analyses to meet conditions where heat, corrosion, pressure and structural strength are involved.

**SIZE RANGE — WALL THICKNESS:**

½ to 6 inches O.D. — wall thickness .035 to 1,000 inch.

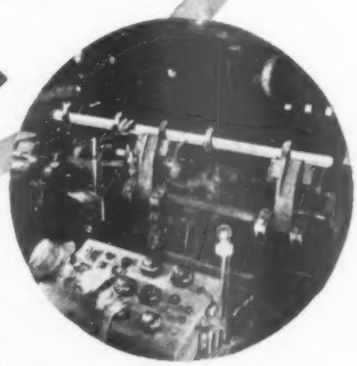
**TYPICAL APPLICATIONS:**

Pressure tubes — Superheater tubes — Condenser tubes — Still tubes — Evaporator tubes — Barrel tubes — Oil-well Pump Barrels — Mechanical tubes — Aircraft tubes — Propeller tubes — Rollers for Transmission Chains.

Globe engineers gladly give you the benefit of specialized knowledge of stainless steel tubing in a wide range of services and applications — to improve your product — to cut costs.

**TO BE SURE . . . SPECIFY GLOBE**

The heating, piercing, rolling of seamless tubes is controlled at every step for uniformity, close tolerance.



WHEN you specify Globe, you get uniform high quality alloy steel tubes, the product of highly developed production facilities and specialized quality controls and methods. All Globe tubes are thoroughly inspected and closely held within tolerance specifications. Write for the Globe general catalog.

**GLOBE STEEL TUBES CO.** Milwaukee 46, Wisconsin Chicago • Cleveland • Philadelphia • St. Louis • New York Detroit • Denver • Houston • San Francisco • Glendale, Cal.

Producers of Globe seamless stainless steel tubes — Gloweld stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high purity ingot iron) seamless tubes — Globe Welding Fittings.

# JOHNSTON....

## CIRCULATING VALVE

*The most Positive and Versatile ever used!*

**Here's the newest addition to the Johnston Testing Assembly. It's the Johnston Sleeve Type Circulating Valve, for *Safer*, more *Conclusive* Drill Stem Testing. It is announced only after many hundreds of successful runs under many varying conditions in fields throughout the United States.**

**The Johnston Sleeve Type Circulating Valve is the answer to the Drilling Industry's demand for a circulating valve to be used for reverse circulating out the recovery on Drill Stem Tests with these qualifications:**

1. **Insert at any desired point in the drilling string to allow circulation at that point.**
2. **No pump pressure applied to the top of fluid recovered on test; no pollution of fluid from test zone.**
3. **Minimum obstruction of inside of drill pipe — The Sleeve Type Circulating Valve provides a minimum of 1¾" of opening inside both 4½" and 3½" drill pipe.**
4. **Positive — No manipulation of the pipe required to operate the valve. A special type go-devil is the operating medium.**

**For complete details and engineering data write for the Treatise entitled "Reverse Circulation in Drill Stem Testing."**

## JOHNSTON TESTERS, INC.

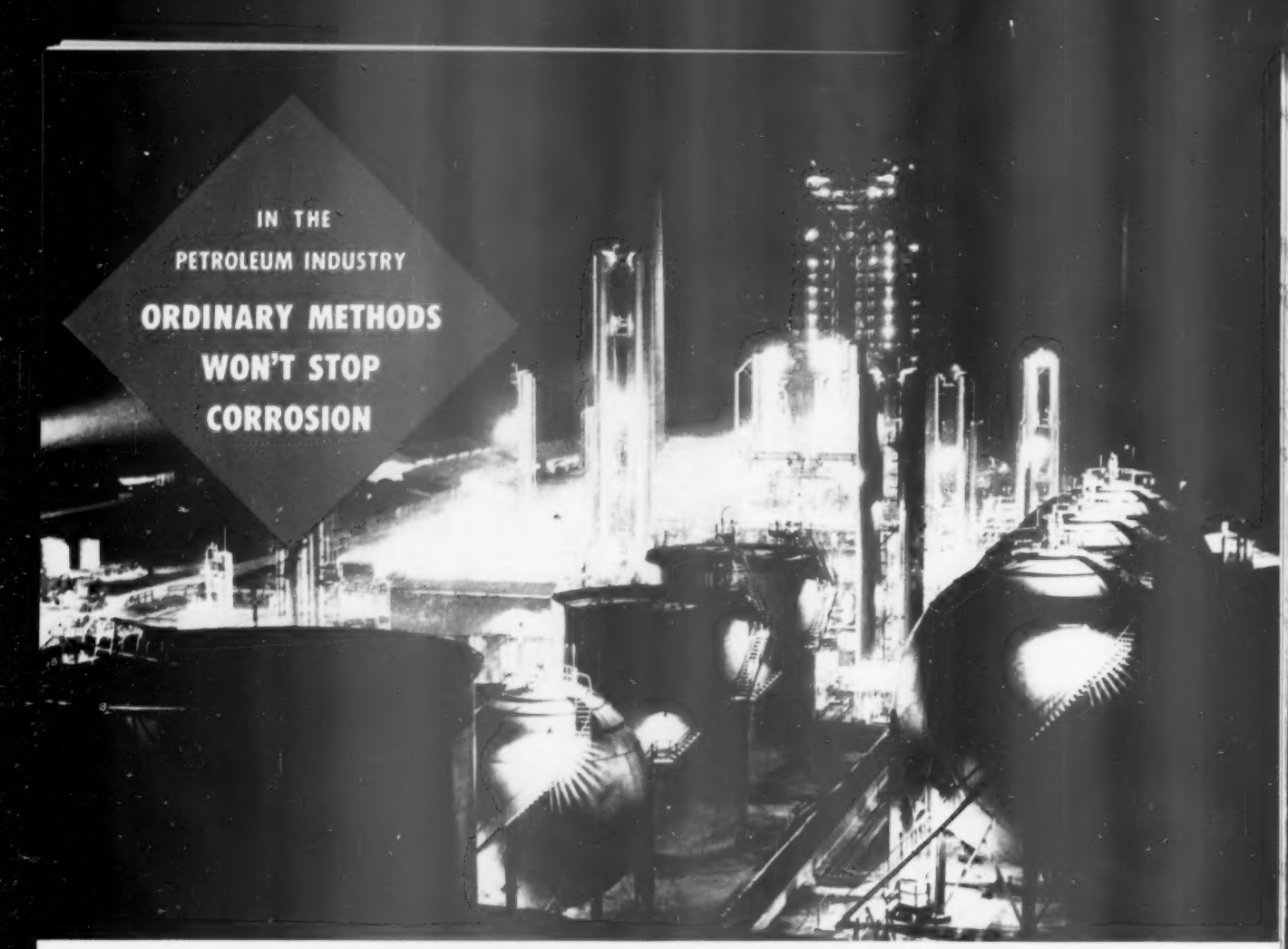
**POST OFFICE BOX 165 • HOUSTON, TEXAS**

FORMATION AND CASING TESTING — JOHNSTON

EXPORT DIVISION: 3035 Andrita St., Los Angeles 65, California

SERVICE BRANCHES IN ALL ACTIVE AREAS

*There's a Johnston Service Representative Near You*




# SPECIFY THE AMERCOAT METHOD— Designed to Give You *PLUS* PROTECTION

Ordinary methods for controlling corrosion usually produce the ordinary results—rapid paint failure, costly replacements, product contamination, excess down-time, and hampered production. Halfway measures and the use of one or two general purpose coatings simply cannot provide adequate protection against corrosion's ceaseless attack.

Amercoat gives you a proven method of corrosion control, assuring you proper protection through these PLUS features:

**1. Careful analysis** by a trained engineer of all the conditions present in each corrosion problem.

**2. The ONE best recommendation** for the particular problem. AMERCOAT is a complete line of coatings, each formulated to solve or control specific corrosion problems.

**3. On-the-job assistance** to your applicators and supervisors by a trained engineer. The AMERCOAT method ensures proper attention to surface preparation and application techniques for maximum protection.

**4. Complete stocks** of fresh materials always near you at one of AMERCOAT's five regional warehouses or more than 20 franchised distributor warehouses throughout the United States.

**5. Service based on experience.** The AMERCOAT method of corrosion control is the result of nearly 20 years' experience in solving or controlling corrosion problems in every major industry throughout the United States.

Write today for the name and address of the AMERCOAT representative in your area. At no obligation, he will gladly help you analyze your corrosion problems and evaluate your present control measures. If it is determined that you have a problem within our scope of experience, he will outline a complete program of AMERCOAT's PLUS protection for your plant or equipment.

Amercoat CORPORATION

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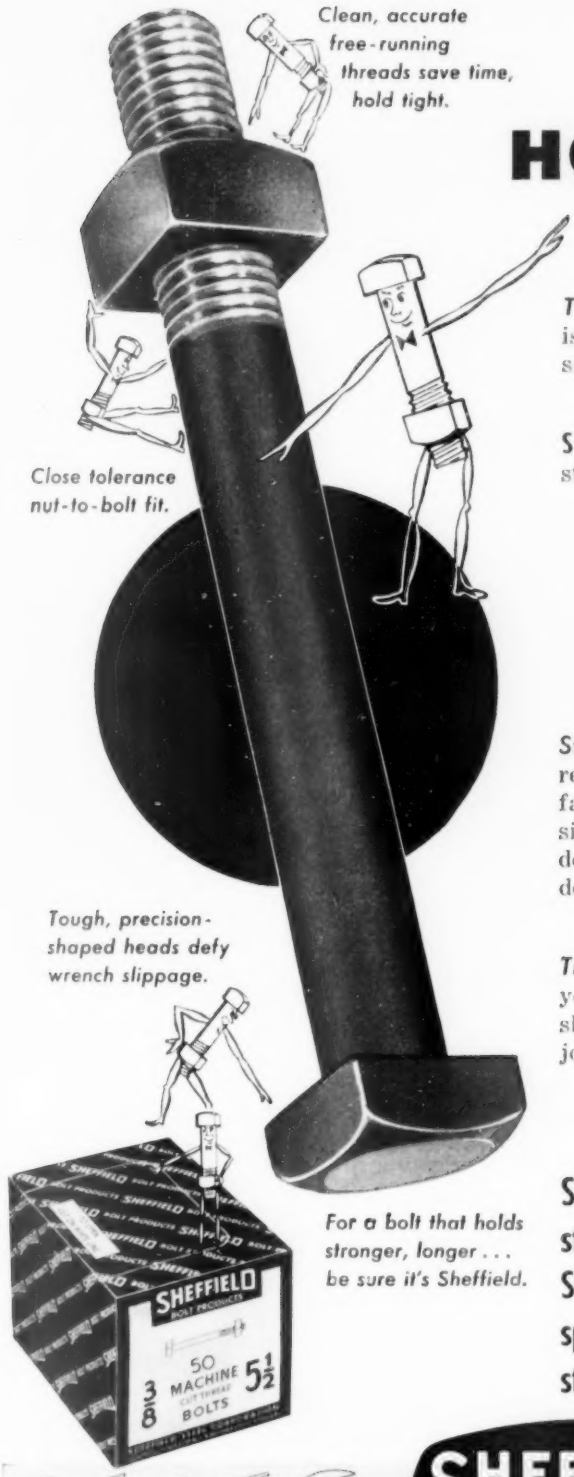
South Gate, Calif.
Chicago, Ill.
Newark, N. J.
Jacksonville, Fla.
Houston, Texas




## *Here's the Extra*

# HOLDING POWER

## *You Want in a Bolt*

***The tensile strength*** of the shank of a Sheffield bolt is something you can depend on—to carry compression loads and withstand shear stresses.

**STATISTICAL QUALITY CONTROL** through every step of manufacture puts extra holding power in

# SHEFFIELD

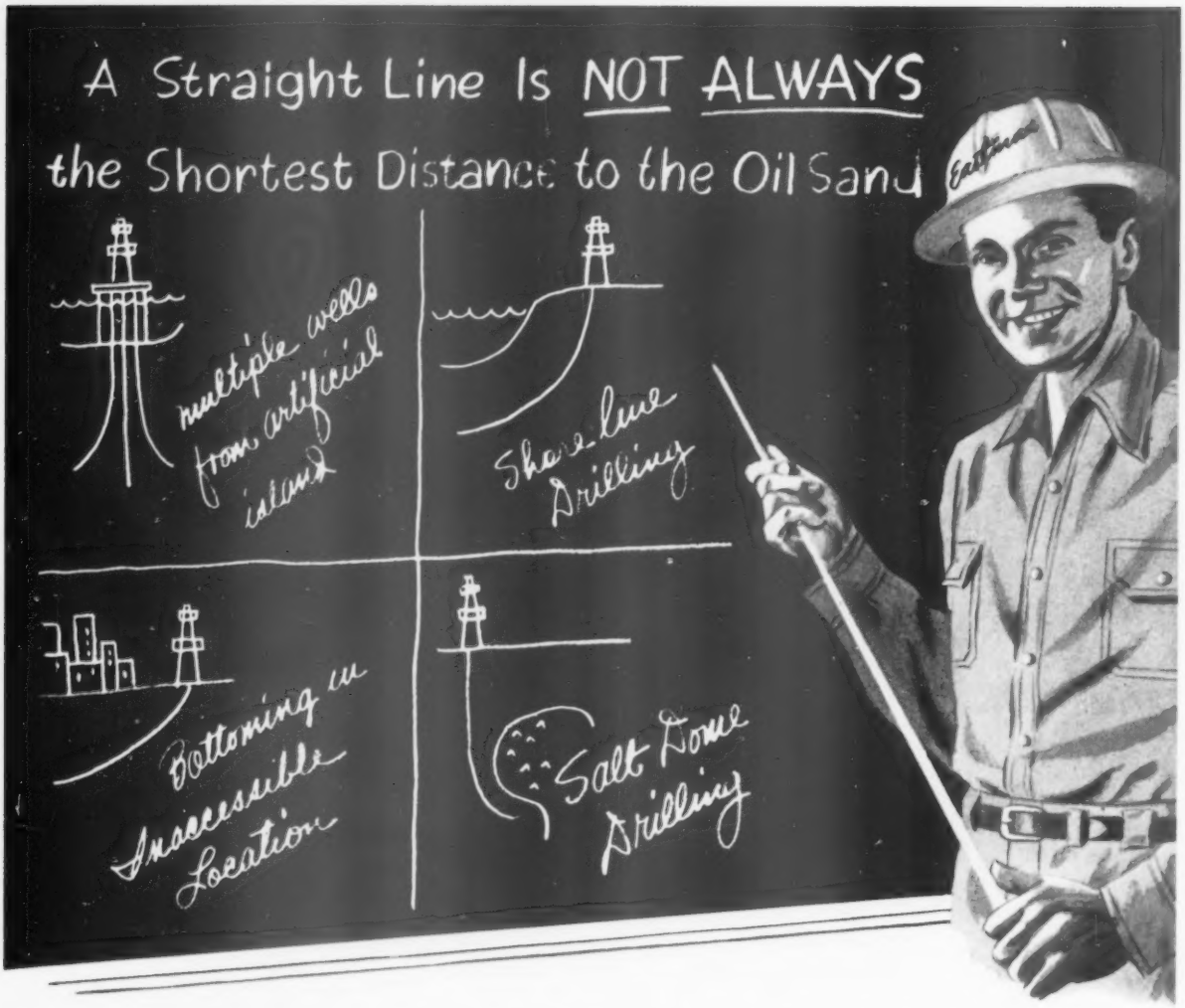
## BOLTS and NUTS

***Statistical Quality Control*** is Sheffield's system of recording data on variation at every step in manufacture. This data is analyzed by statistical methods similar to those used in aircraft production. Any deviation from Sheffield's high quality standards is detected and corrected at once.

***This means quality*** you can count on and uniformity you can be sure of in every bolt, every carton, every shipment. Sheffield bolt and nut products have enjoyed this kind of confidence since 1888.

**SHEFFIELD quality starts with Sheffield-made special analysis steel.**

**SHEFFIELD**
**STEEL**
**CORPORATION**
HOUSTON KANSAS CITY
TULSA
SUBSIDIARY OF ARMCO STEEL CORPORATION


A Straight Line Is NOT ALWAYS
the Shortest Distance to the Oil Sand
multiple wells from artificial island
Shore-line Drilling
Bottoming in Inaccessible Location
Salt Dome Drilling
Eastman

## When You Have Need for Directional Drilling Service

**CALL**

**Eastman**

As the result of DIRECTIONAL DRILLING, millions of barrels of oil have been produced which otherwise would not have been recovered.

As originators of controlled Directional Drilling Service, Eastman can give you the benefit of 23 years of experience. Therefore, whenever Directional Drilling is advisable, put that responsibility in competent hands.

Be assured of the best results — CALL EASTMAN!

Originators of Controlled Directional Drilling Service
Pioneers of Oil-Well Surveying

22 OFFICES **FOR YOUR CONVENIENCE**
**CONSULT YOUR TELEPHONE DIRECTORY**

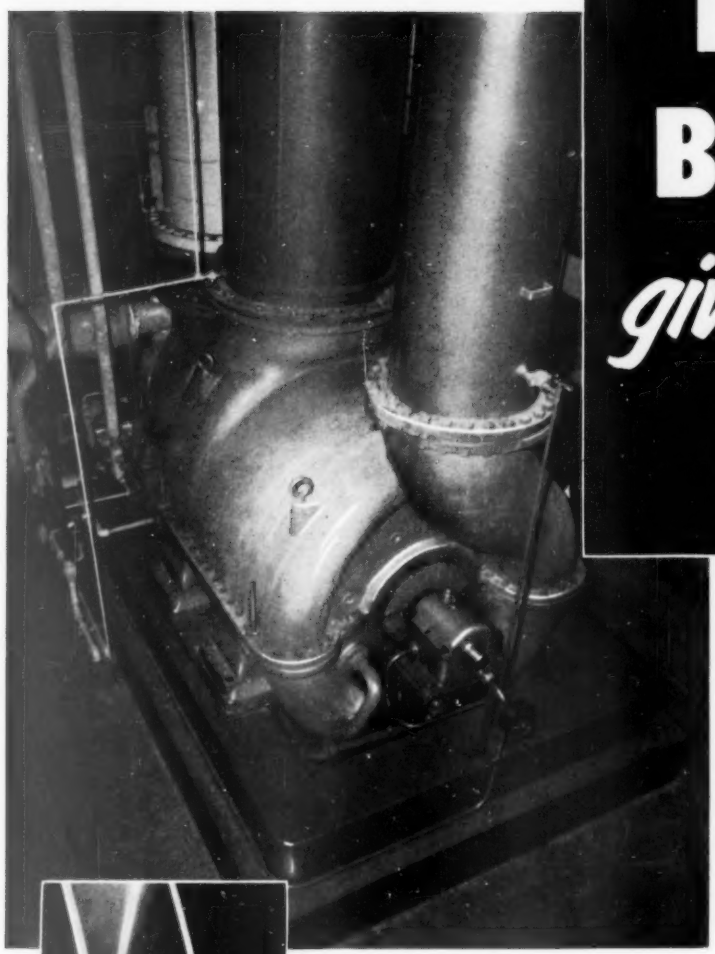
SEE OUR CATALOG IN THE COMPOSITE CATALOG

**EASTMAN OIL WELL SURVEY CO.**

LONG BEACH **DENVER** HOUSTON

*Export Sales and Service*
EASTMAN INTERNATIONAL COMPANY ★ P. O. Box 1500 • Denver, Colorado

# ELLIOTT BLOWERS *give marathon service*



**WELDED IMPELLERS** *are one of the many reasons why Elliott blowers are getting ever-increasing acceptance for process work. Note the smooth contours, heavy blades, and generally rugged construction (as compared to conventional riveted impellers). These impellers are completely homogeneous and can be made of any weldable material having reasonable mechanical strength.*

CONTINUOUS AND RELIABLE performance is an established characteristic of Elliott centrifugal blowers. This is proven in numerous modern refineries where large quantities of air are required for conveying and regenerating catalyst.

The blower installation pictured is typical. Serving an important midwest refinery, it is rated at 30,000 inlet cfm, compressing air to a discharge pressure of 26 psig. Day and night this blower is driven at 4750 rpm by an Elliott direct-connected 3140-hp condensing steam turbine.

*For full details of Elliott blowers, contact your local Elliott representative or write Elliott Company, Jeannette, Pa.*

**ELLIOTT Company**

**CENTRIFUGAL BLOWER DEPARTMENT**

P3-6

# The answer to high pressure gas scrubbing

**The Problem**

Cleaning waste liquids and solids from gas for pressurized reinjection into wells.

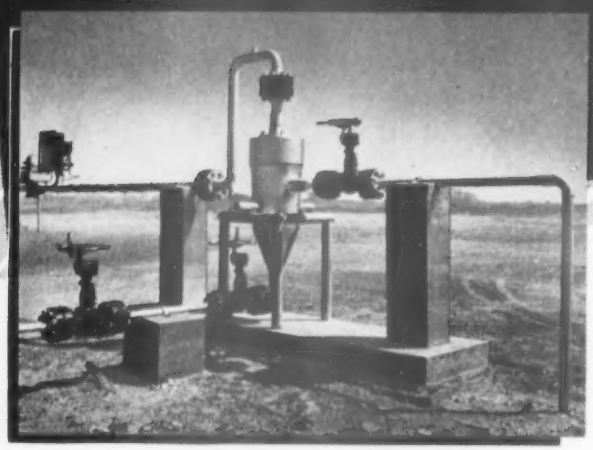
**The Equipment**

AEROTEC

DRY GAS SCRUBBERS

**The Results**

1600 gallons of waste products extracted daily from 9 million cubic feet of reinjection gas.



Installations of Aerotec Gas Scrubber at University, Block 31, Field, Crane County, Texas.

Cutaway section of Aerotec Gas Scrubber designed for high pressure applications.

New Proof of the practical, profitable advantages of Aerotec Dry Gas Scrubbers comes from the oil-producing industry. This backs up the long experience of natural gas companies with hundreds of units in daily use. These Aerotec Scrubbers, at wells and in pipelines, are cleaning foreign liquids and solids from natural gas with exceptionally high efficiency.

This Aerotec high pressure application is successfully employed by the Atlantic Refining Company in a jointly-owned claim in the University, Block 31, Field located in Crane County, Texas. The Aerotec Gas Scrubber removes components of lubricating oil from gas going to injection wells at 4,000 psi. It has also removed sand, mill scale and iron sulfides, and because no fluids are used in the separation process, no residue is carried over to the gas.

Additional units are now being installed before new injection wells are put into operation.

Lightweight and compact, Aerotec Gas Scrubbers are easy to install. Available in standard units up to 100,000,000 SCFD, they can be manifolded to meet larger requirements. For experienced engineering assistance in matching Aerotec Scrubbers to *your* specific need, or for catalog data on these units, call or write The Thermix Corporation.

*Project Engineers* **THE THERMIX CORPORATION** Greenwich, Conn.

*(Offices in 38 Principal Cities)*

*Canadian Affiliates:* **T. C. CHOWN, Ltd., Montreal 25, Quebec; Toronto 5, Ontario**

*Manufacturers*

**THE AEROTEC CORPORATION**

**GREENWICH, CONN.**

# New BROCHURE!

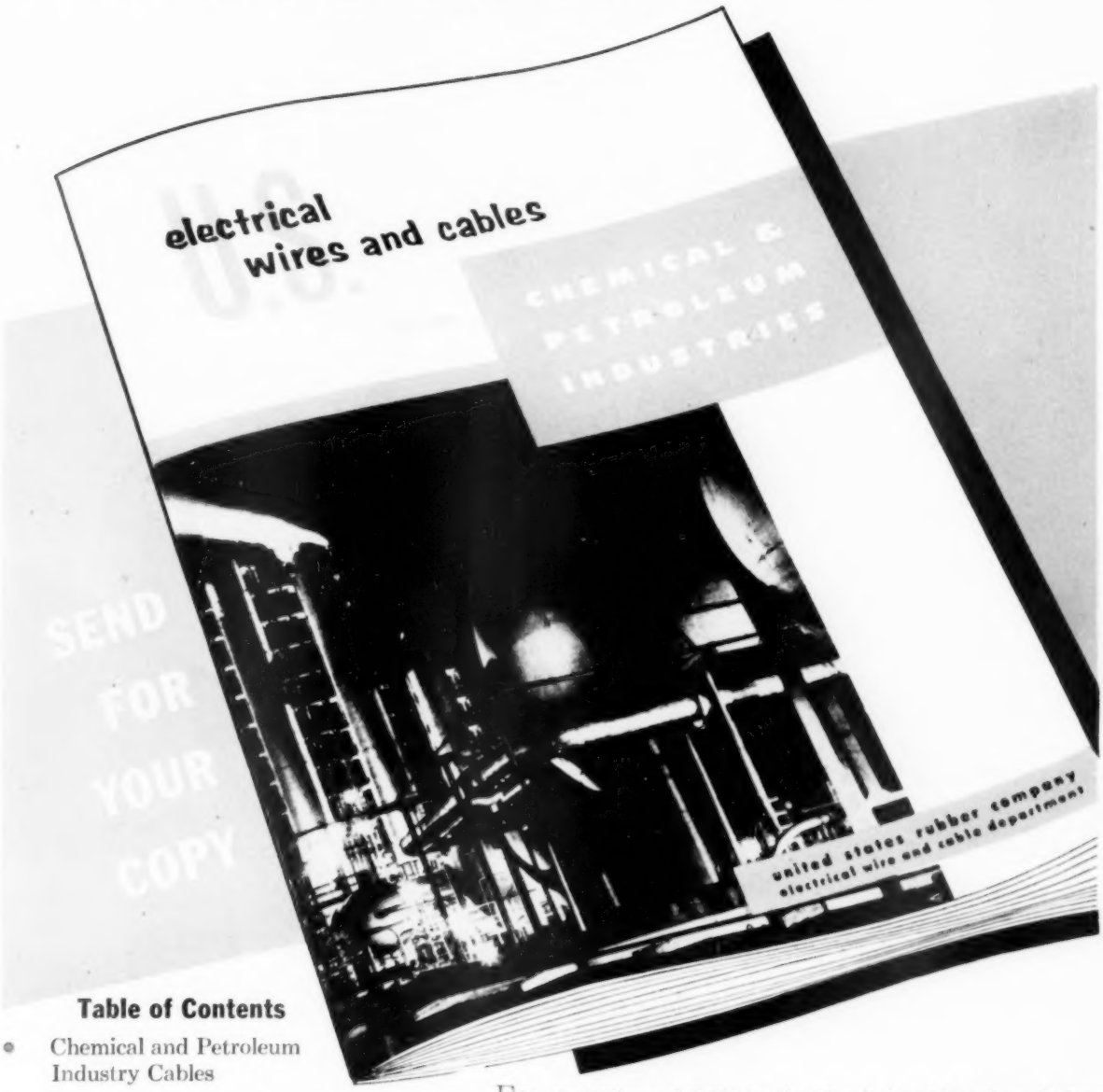



**Table of Contents**

- Chemical and Petroleum Industry Cables
- Insulation Compounds
- Jacket Compounds
- Portable Cables
- Power Cables
- Control Cables
- Telephone Cables
- Tables

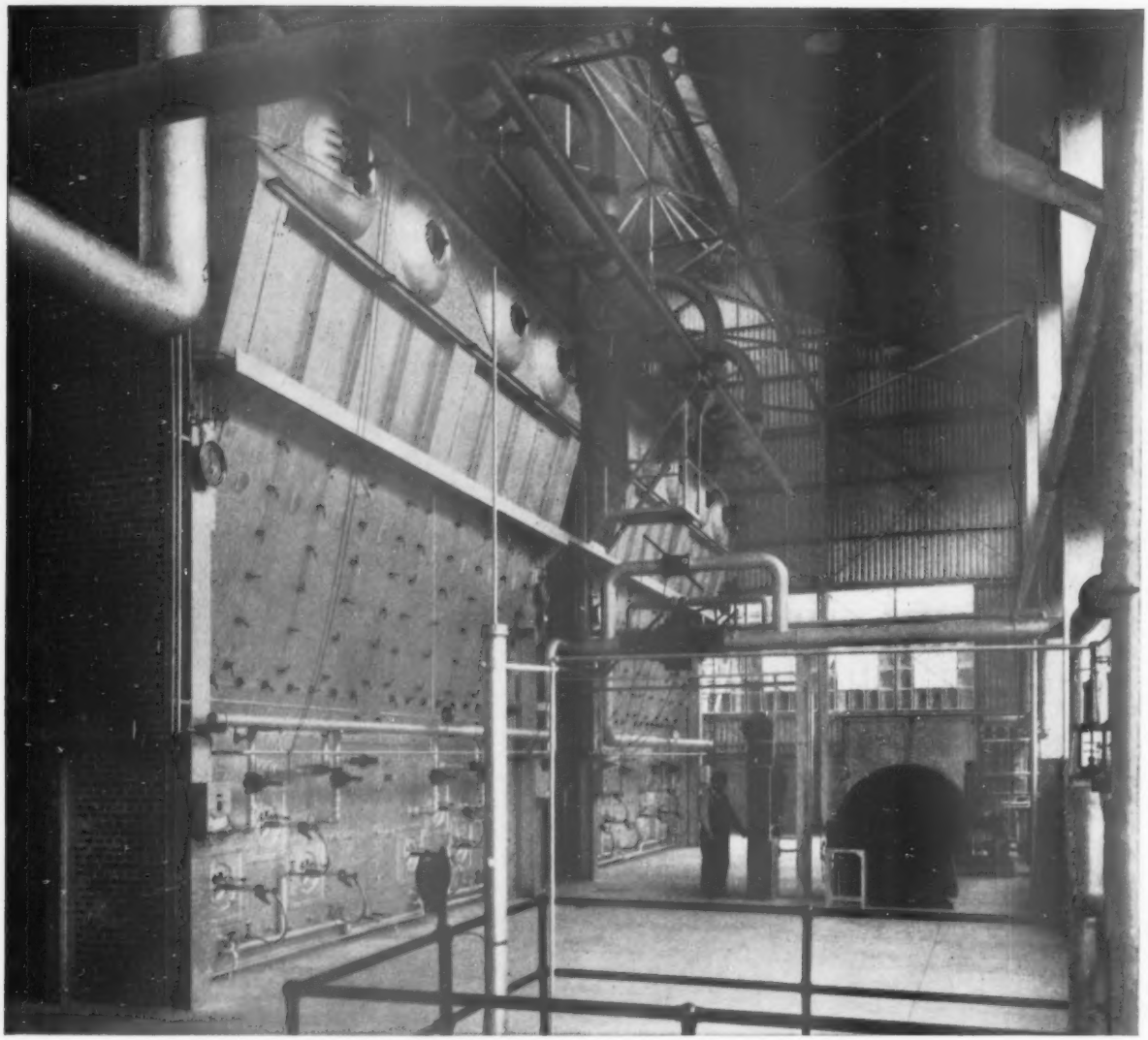
Electrical Wire and Cable for the Chemical and Petroleum Industries must have the right chemical, oil and corrosion-resistant insulations plus the right electrical and physical properties for the job. Insulations and jackets which may be excellent for one type of service may be unsatisfactory in another. United States Rubber Company, a specialist in manufacturing the *right* electrical wires and cables for the Chemical and Petroleum Industries, is the only wire and cable manufacturer growing its own natural rubber, making its own synthetic and plastic insulations.

The brochure shown above shows what "U.S." wires and cables to order for specific applications. Write to address below for your free copy.

## UNITED STATES RUBBER COMPANY

U.S. RUBBER

*ELECTRICAL WIRE AND CABLE DEPARTMENT • Rockefeller Center, New York 20, N. Y.*



# How to brighten dark rooms with just one coat of paint

When you consider labor costs on a job like this, you soon realize that it's only good business to use the best quality paint. Particularly when an aluminum paint formulated to your specific needs may well save you the cost of a second coat.

While Alcoa does not make paint, it's our business to know all about the aluminum pigments that go into the best brands. We supply most of them. Working together, Alcoa technicians and leading paint manufacturers have found ways to combine pigments and vehicles for the utmost protection against the most common industrial paint problems—heat, cold, dirt, moisture, smoke, fumes and corrosive action.

If there's a spot that needs brightening in your plant—or a smokestack, tank, boiler or other equipment that deserves preserving—find out how far a brushful of the *right* aluminum paint will go, *how long it will last.*

Ask your paint supplier about specially formulated aluminum paints made with Alcoa® Albron Pigments. Or tell us your problems. We'll gladly recommend the correct type of aluminum paint for your job.

For a free copy of our 32-page booklet, *Painting with Aluminum*, just call your local Alcoa sales office or write: Paint Service Bureau, Aluminum Company of America, 1791-G Alcoa Building, Pittsburgh 19, Pennsylvania.

**Alcoa Aluminum**

ALUMINUM COMPANY OF AMERICA

# FLUOR GAS CLEANERS

*will meet or exceed their guarantee*

★ Fluor liquid removal Gas Cleaners installed on the intake side of compressors are your best insurance against slugging and costly damage to pumping equipment. Repeated change of direction of the gas stream and the novel design of the two mist extracting elements remove all liquids from gas by mechanical means. Fluor guarantees a liquid loss not to exceed .05 gallons per million standard cubic feet of gas. Our customers have reported a carry-over of approximately .01 gal./mmscf.

Fluor liquid removal Gas Cleaners come in two models: WL (single pass), and WLL (double pass) for higher liquid loads. To determine the correct size of a gas cleaner, Fluor engineers use these variables: (1) Operating pressure. (2) Operating temperature. (3) Throughput of gas. (4) Gas density. (5) Liquid density. In addition, Fluor takes into account *the quantity of liquid entrained in the gas!* Thus Fluor Gas Cleaners meet or exceed their guarantee not only at a specific point but through the whole range of operating conditions.

**FLUOR SOLID REMOVAL GAS CLEANERS**—For removing dust from gas lines Fluor Model DV Gas Cleaner features a Venturi spray chamber which aspirates oil in proportion to gas flow rate. All dust particles are thoroughly wetted and dropped out during passage through the expansion areas and mist extraction elements. The liquid removal portion of the scrubber is similar to the WLL unit (illustrated here) with two elements and three dropout areas.

*For full details on Fluor Gas Cleaners, write for Bulletin GC-0.001*

BE SURE WITH **FLUOR**

THE FLUOR CORPORATION, LTD.
LOS ANGELES 22, CALIFORNIA

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SAN FRANCISCO
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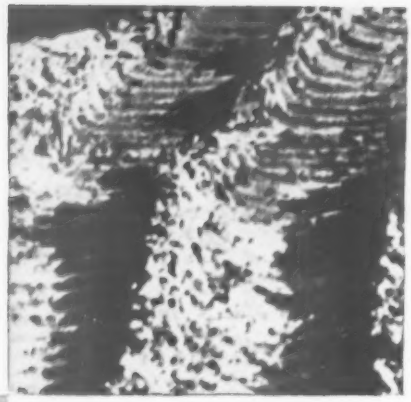
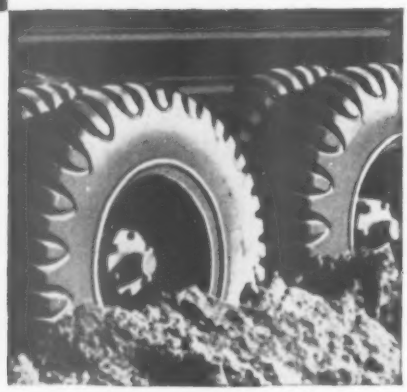
# THE TRACK



# OF A

# Mack TELLS A

# STORY OF



# Power

Ever notice the ground where a Mack six-wheeled truck has passed over? No scuff marks here. The track of a Mack tells a story of unfaltering traction . . . of surefooted, relentless driving power.

The "reason why" is found in Mack's Balanced Bogie with exclusive inter-axle and inter-wheel Power Dividers that assure positive traction under the most adverse conditions. Acting normally as a true differential, the Power Divider delivers torque between the bogie axles and wheels in proportion to wheel traction, thus eliminating useless wheel slippage and spinning.

Your nearest Mack branch or distributor will show you how Mack six-wheelers can keep your big loads moving fast—no matter how tough the terrain—on dependable, time-saving, cost-cutting schedules.

Mack TRUCKS

1726

**. . . Outearn Them All**

Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

# They Say—

### Amendment Weakens Shelf Bill

"The bill that the Senate has passed for federally controlled development of the undersea oil resources of the outer Continental Shelf is far superior to the one passed by the House. . . .

"However, a last-minute amendment slipped into the bill on the Senate floor could open the way for an eventual weakening of federal authority in favor of the states, a temptation which the Secretary of Interior will have to find the strength to resist.

"As it passed the Senate the measure includes the long-discussed Hill amendment, ultimately setting aside federal revenues from the undersea resources for distribution among the states for educational purposes . . . we hope this provision, which is absent from the House bill, will be retained in conference."

*Editorial in the New York Times.*

### Federal Aid Not Needed

"Oil industry expansion has been encouraged by the Government for military reasons. But the expansion was achived without government subsidies, without government loans, and without government grants. It was achieved without regulation. In fact, it was achieved in spite of regulations. The over-all accomplishments were obtained individually by thousands of oil producers, hundreds of refining companies —all working independently. Each man or each company sought individually to fortify his own security through his own productive capacity. Each competed vigorously for the markets available or for an expansion of those markets, so that funds would be available to him to continue building.

"Many members of the industry have worked harder and for longer hours than has been their regular practice. We all realize that it will take hard work in the future as each individual or each company strives to maintain its place in this highly competitive race."

*John W. Boatwright, general manager of Distribution Economics Department, Standard Oil Co. (Ind.), in an address at the University of Missouri, Coumbia.*

### Antitrust Laws Need Revision

"There is not a great deal of law governing international trade and such as there is is extremely confusing and often conflicting. Clarification in the nature of a revision and restatement of the law would be very much in the interest of all engaged in foreign trade, which of course embraces a much broader field than is occupied by the petroleum industry. I doubt that a long and bitter court battle involving the foreign operations of our industry alone would help materially with this clarification. Better results might reasonably be expected to flow from a thorough and constructive study of this whole complicated situation sponsored by the Government and in which I am sure all industry would cooperate."

*George V. Holton, board chairman of Socony-Vacuum Oil Co., Inc., addressing the annual meeting of stockholders.*

### States Falsely Accused

". . . to say that the states are holding back their oil production in order to increase the price . . . is absurd.

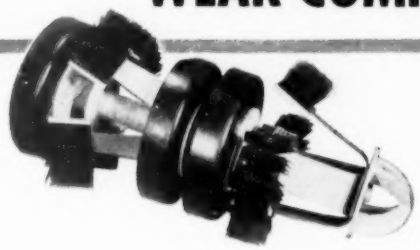
"I don't see how the several oil producing states can be accused of restricting production below demand when the storage of crude oil above ground has continuously increased all over the nation.

"For example, there is right now 270,000,000 bbl. of oil in the nation


Williamson
PIPELINE PIGS-

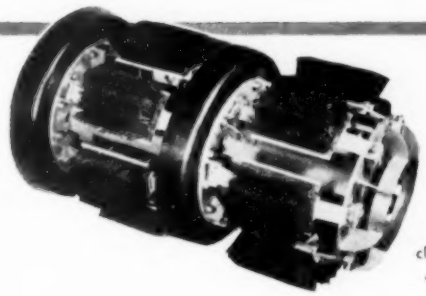
the standard for oil lines because they have

WEAR COMPENSATION



TYPE WCK-11
WILLIAMSON PIG

Sizes 6" to 14" and will traverse 6-foot radius field bends, conventional pipeline gate valves. Springs compensate for brush wear.



TYPE GP-4
WILLIAMSON PIG

The standard tool for Big-inch oil lines everywhere. Brushes are expanded by arched springs for efficient cleaning . . . Brush and cup have a service life up to 1,000 miles.

Send for descriptive folder showing uses of Williamson Pigs.

T.D. Williamson, Inc.

THE PIG WITH THE POKE
CLEANS PIPE LINES

P. O. BOX 4038
TULSA 9, OKLAHOMA

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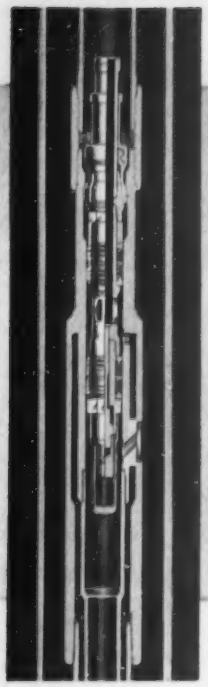
CASPER • PROVO, UTAH • LOS ANGELES • OAKLAND • EDMONTON • CALGARY
TORONTO • BUENOS AIRES • DURBAN, NATAL, SOUTH AFRICA

**Pull a Choke Instead of Your Tubing**



Otis "Selective" Cross-Over Nipple Assembly with Removable Wire Line Chokes

***FOR DUALLY-COMPLETED WELLS***

- Select the operation you want and perform it without killing the well, pulling the tubing, or moving the packers
- Produce two horizons simultaneously — parallel or crossed-over — without commingling fluids
- Acidize, fracture, test, circulate, or plug either zone independently

OTIS

**OTIS PRESSURE CONTROL, INC.**

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Falfurrias • Beaumont • New Iberia • Shreveport • Houma
Brookhaven • Hobbs • Okla. City • Elk City • Pauls Valley
Canadian Dealer: Otis Pressure Control Export, Inc., Edmonton, Alberta

stored above the ground, whereas the highest working stock ever estimated to be necessary heretofore has been 260,000,000 bbl.

"So I say again, how can the states in view of that situation be accused of restricting production below demand in order to increase the price?"

*Gov. Edward F. Arn of Kansas, chairman of the Interstate Oil Compact Commission, in a news conference at Topeka, Kans.*

**Oil Industry Aids Everyone**

"The story of the Williston area and North Dakota is a first-class lesson in what competitive enterprise means to the development of a country. In a recent address Dr. Robert E. Wilson of the Standard Oil Co. of Indiana said, 'Many new jobs are being created, not only oil jobs, but jobs in all the related businesses—supply, construction, transportation, manufacturing, and in the merchandising and service trade to outfit and feed and house the rising population.'

"As Dr. Wilson also pointed out, the money that it took to find the oil and develop it to its present importance 'wouldn't have been spent except for the hope of profit—the great dynamic which has built our country and our industry.'

"Nebraskans who are constantly clamoring for a 'soak the oil industry' program should heed the words of Dr. Wilson. Nebraska, like North Dakota, is predominately an agricultural state, but a great new industry has been created in our midst by the discovery of oil and gas. The oil business believes in paying its way, but it will not be subjected to discriminatory taxes without a fight. Nebraska, long short on industry, needs the oil industry."

*From an editorial in the Sidney (Nebr.) Telegram.*

# CALENDAR OF EVENTS

**JULY**

**July 30-Aug. 1** Wyoming Geological Association, eighth annual field conference, University of Wyoming, Laramie.

**AUGUST**

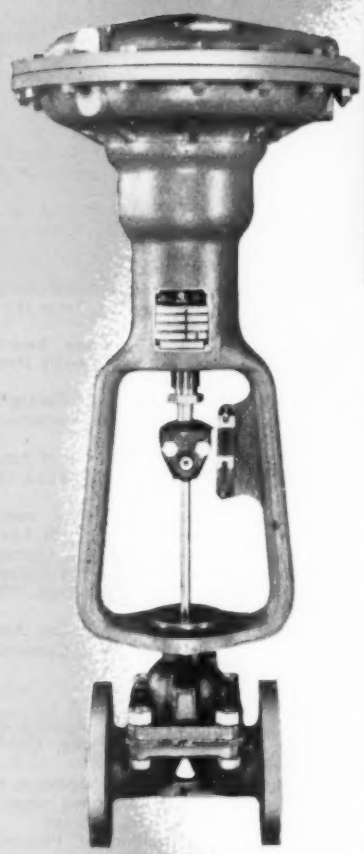
**17-19** Society of Automotive Engineers, international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

**18-21** American Institute of Electrical Engineers, Vancouver Hotel, Vancouver, B. C.

**24-26** Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

# 2 Good Reasons Why "CLIMAX" Means "Accurate Controls" to So Many Industries:

**1555-D–**
Air to close valve...opens with air supply failure.



## CLIMAX
### Type 1555
## CONTROL VALVES

**Reliable and Efficient** BS&B Type 1555 Climax Control valves are outstandingly useful for on-off or narrow band control, on slurries or viscous liquids. Cast iron bodies and rubber diaphragms permit use up to 180° F maximum temperature... body sizes range from ½" to 6". Type 1555 valves are also available with stainless steel bodies, and with linings of rubber, glass or lead.

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**1555-DRT–**
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**BLACK, SIVALLS & BRYSON, INC.**
Climax Controls Division, Department 4-A7
7500 East 12th Street Kansas City 26, Missouri

**Aug. 31-**
**Sept. 1** Interstate Oil Compact Commission, Northern Hotel, Billings, Mont.

**SEPTEMBER**

**6-11** American Chemical Society, national meeting, Conrad Hilton Hotel, Chicago.
**9-11** Pacific Coast Gas Association, San Francisco.
**11-12** Association of Desk and Derrick Clubs of North America, annual meeting, Cosmopolitan Hotel, Denver.
**13-16** American Institute of Chemical Engineers, Fairmont and Mark Hopkins hotels, San Francisco.
**15-16** American Petroleum Institute, executive committee, Greenbrier Hotel, White Sulphur Springs, W. Va.
**16-18** National Petroleum Association, annual meeting, Hotel Traymore, Atlantic City, N. J.
**21-22** Natural Gasoline Association of America, fractional analysis seminar, Texas Hotel, Fort Worth.
**21-25** Instrument Society of America, national instrument conference and exhibit, Sherman and Morrison hotels, Chicago.
**24-25** Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.
**27-30** American Society of Mechanical Engineers, annual conference, petroleum division, Rice Hotel, Houston.
**Sept. 27-Oct. 2** American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C.
**28-29** Independent Natural Gas Association of America, Shamrock Hotel, Houston.
**Sept. 30-Oct. 2.** American Association of Petroleum Geologists, Mid-Continent regional meeting, Masonic Building, Wichita.
**Sept. 30-Oct. 2** National Association of Corrosion Engineers, Permian Basin section, biannual field tour, Lincoln Hotel, Odessa, Tex.

**OCTOBER**

**1- 2** Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.
**4- 6** American Association of Oilwell Drilling Contractors, thirteenth annual meeting, Cosmopolitan Hotel, Denver.
**5- 7** Petroleum Electric Power Association, silver anniversary meeting, Muehlbach Hotel, Kansas City.
**6- 7** Texas Mid-Continent Oil and Gas Association Rice Hotel, Houston.
**7- 9** National Association of Corrosion Engineers, south central region, Mayo Hotel, Tulsa.
**8- 9** California Natural Gasoline Association, annual fall meeting, Ambassador Hotel, Los Angeles.
**11-17** Oil Progress Week.
**19-20** Independent Petroleum Association of America, annual meeting, Texas Hotel, Fort Worth.
**22-23** Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
**22-24** Gulf Coast Association of Geological Societies, third annual convention, Shreveport.
**23** Natural Gasoline Association of America, regional meeting, Blackstone Hotel, Tyler, Tex.
**26-29** American Gas Association, annual conference, Kiel Auditorium, St. Louis.
**27** Association of Consulting Chemists and Chemical Engineers, Inc., annual meeting, Hotel Belmont Plaza, New York City.
**29-31** Rocky Mountain Oil and Gas Association, annual convention, Cosmopolitan Hotel, Denver.

**NOVEMBER**

**3- 4** Society of Automotive Engineers, national diesel-engine meeting, Conrad Hilton Hotel, Chicago.
**5- 6** Society of Automotive Engineers, national fuels and lubricants meeting, Conrad Hilton Hotel, Chicago.
**5- 6** American Association of Petroleum Geologists, Pacific section annual meeting, Hotel Biltmore, Los Angeles.
**9-11** Geological Society of America, annual meeting, Royal York Hotel, Toronto, Ont.
**9-12** American Petroleum Institute, annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
**12-13** Society of Exploration Geophysicists, midwestern meeting, Adolphus Hotel, Dallas.
**19-20** Annual Instrument Short Course, Los Angeles Harbor Junior College, applied technology division, Wilmington, Calif.
**20** Natural Gasoline Association of America, regional meeting, Herring Hotel, Amarillo, Tex.

**DECEMBER**

**13-16** American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

Around a cooling tower or anywhere else you've got pipe to join, the handiest, surest way to get "Flexible-Tight" joints is with Dresser Couplings or Long Sleeves.

Dressers provide the "give and take" necessary to absorb vibration, settlement and other stresses. Specially compounded rubber gaskets permit up to 4° deflection at joints—yet with Dressers, these joints stay permanently tight.

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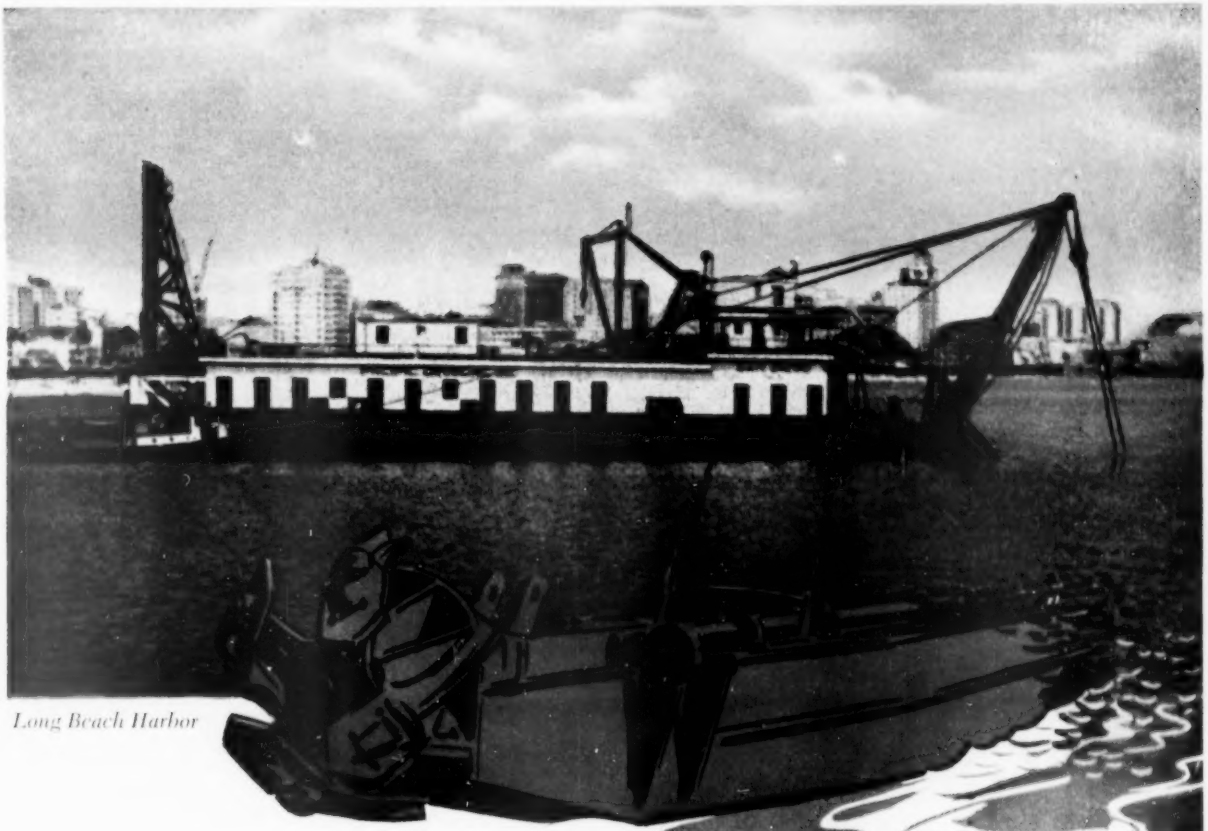

*Long Beach Harbor*

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MACCO Corporation, widely known as one of the leading builders of earth-fill dams, canals, bridges, highways and similar construction projects also offers complete dredging and harbor development facilities. Two diesel electric dredges the 30-inch San Diego and the 24-inch Olympia, are operated under the name of Pacific Dredging Company, a corporation jointly owned by MACCO Corporation and Puget Sound Bridge and Dredging Company.

Pacific Dredging crews have years of experience excavating different types of materials under diversified conditions. They know their particular dredge's capacity and how to obtain its maximum output most economically. For complete details write for fully illustrated brochure "Dredging in the Western Hemisphere."

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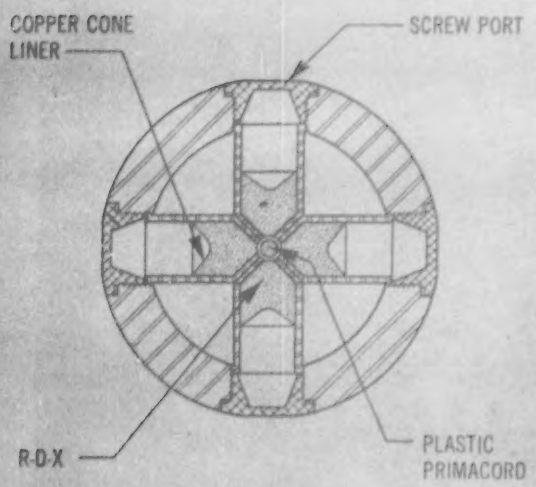
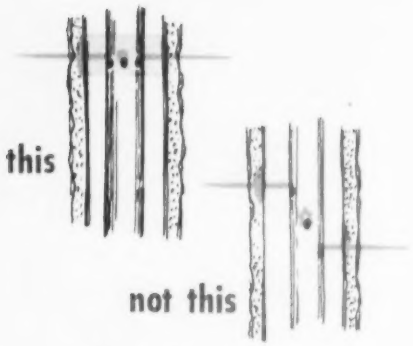
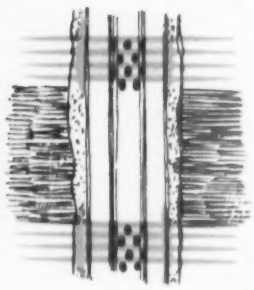



The diagram above shows the charge arrangement in the "4-Way" gun.

# WATER-PROOFING

## the pay zone with Lane-Wells new "4-way" gun



Protect both top and bottom on the same run

This new KONESHOT Gun was developed for just one purpose—to help insure the success of "block-squeezing" to protect the pay. Reports from the field indicate that the "4-Way" gun is giving excellent results. We call it the "4-Way" gun because, for the first time, engineering design puts 4 Koneshot charges in the *same plane*, firing four shots all on the same level, 90 degrees apart. Thus, when cement is forced through the perforations into the crevices of a zone of weakness, or along the bedding plane, it tends to form a continuous sheet, or pancake, completely encircling the well bore—a solid, one-piece shield that effectually halts fluid migration from either above or below. Also, for still greater efficiency, the "4-Way" gun pattern is available in Lane-Wells famous semi-selective F-2 gun, so you can perforate both above and below the pay *on one run.*

**Lane-Wells gun design** gives you better squeeze jobs...
**accurate depth measurements** put the shots in the exact spot ordered
...and get **the job done right**...the first time—call

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Phone 3-6291. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

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# JOURNALLY Speaking

## Speaking of Traveling

THIS is the time of year when practically everybody takes a vacation. And, thanks to petroleum, most people manage to get a long way from nome during their 2 or 3 weeks off.

This year can really be called the semicentennial of automotive travel. It was 50 years ago, on December 17, 1903, that the Wright brothers flew the first airplane at Kitty Hawk, N. C. The automobile goes back a little further if you count a long series of sporadic and commercially unsuccessful experiments. But the Ford and Buick companies are each 50 years old this year, the only motor makers which have been in business continuously all that time, so 1903 can be said to be the start of the automobile industry. About that time, also, the migration of the oil industry into the Southwest, following the spectacular discovery at Spindletop, brought flush production which assured the nation plenty of oil and made oil men interested in developing a market for the waste product, gasoline.

Since then, the combination of the automotive and petroleum industries has revolutionized vacation travel. Consider the case of Lewis and Clark, the first white men to discover some of America's finest vacation spots. They hiked from the Mississippi River to the Pacific Northwest and back again, but it took them from May 1804 to September 1806. This summer thousands of vacationers will rediscover the same spots in a matter of days or hours by means of automobile or airplane, and be back home in time to show up at the office on Monday morning.

A lot of others who don't care to mark the fiftieth anniversary of the gasoline age by traveling long distances will help celebrate the 300th anniversary of one of the most famous best-sellers in the English language—Izaak Walton's "The Compleat Angler or the Contemplative Man's Recreation." Today's fishermen may not be as contemplative as those of the Elizabethan era, but they get around a lot faster. They get to where the fish are—or are supposed to be—by automobile, and then noisily churn up the waters with outboard putt-putts. Old Ike would turn over in his grave if he knew what gasoline has done to his favorite sport.

For all its contributions to speed and mobility, the petroleum industry has taken a lot of adventure, contemplation, and romance out of travel. Even railroad travel suffers this penalty of progress. For the diesel engine, while adding much in speed, comfort, and economy, has just about eliminated the steam locomotive whistle—that wistful, alluring sound in the night that spoke of faraway places and made you turn over in bed and dream of travel.

## Getting the Urge

IT must be said that the oil industry is doing many things to provide substitutes for the locomotive whistle as an urge to travel. The road maps, illustrated brochures, and advertisements all contribute to getting itching feet—which the oil companies hope mean itching throttle feet.

For example, one such is a new movie produced by Standard Oil Co. (Ind.) and now being widely distributed as a service to the communities in its marketing territory and, incidentally, in the hope of stimulating the demand for a certain brand of gasoline. It's called "Midwest Holiday," and it endeavors to create interest in prime vacation spots in the heart of the continent by combining a travelog with a boy-meets-girl plot in the best Hollywood tradition.

But out on the West Coast, Richfield Oil Corp. is several light-years ahead of everybody with an advertising campaign based on interplanetary space travel. It started out as a way of emphasizing how progressive the company is, but the promoters got so interested in this branch of science-fiction that they have just about convinced themselves that Richfield should open a filling station for rocket ships on the moon.

*Henry D. Ralph*

## WOULD YOU RISK YOUR DRIVE TO SAVE A BALL?

Sometimes you may get a pretty fair drive by teeing off with an old ball to save a new one. And sometimes you get a pretty fair oil well even though you attempt to perforate the casing with out-moded methods. But the record of thousands of JET perforated wells shows that you best protect your well investment, and obtain increased productivity by perforating with Welex Jets. That is why more than 50% of all casing perforating done in the U. S. today is done by the JET process originated by Welex. Welex Jet Perforating gives you the economy of *positive penetration and known hole density* . . . with *no burr, no fracturing,* and *no debris* left in the well. Results cost less with Welex Jets. Call your nearest Welex Station for prompt service day or night.

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# How to get what you want in Washington

A LOT of oil men have expressed surprise that a hostile investigation of the oil industry is now being made by a Republican Congress, that Republican members of the investigating committee are making unfair insinuations and derogatory charges, and that a Republican is sponsoring a bill to impose drastic federal control on the entire petroleum industry.

There is also perplexity that the administration has not yet completely settled the so-called tidelands oil matter in a way satisfactory to the coastal states and offshore operators, and that Republicans in Congress are among those espousing impractical and radical views on offshore oil development.

With equal naivete many oil men refuse to get alarmed about the prospect of federal regulation of gas production as a result of the recent court decision asserting that the Federal Power Commission must control the price of any gas sold for transmission in interstate commerce. The attitude is that if a Democratic Congress passed the Kerr bill, only to have it vetoed by a Democratic president, surely it will be only a routine matter to put similar remedial legislation on the the statute books under this administration.

"I THOUGHT we elected an administration friendly to business and private enterprise," is the usual reaction. This philosophy is a dangerous opiate which can lull the industry into letting down its guard.

The fact is that both political parties contain about equal proportions of people with more or less radical, crackpot, demagogic, knuckle-headed, or antibusiness leanings—a cross-section of the American public. There is still in this country a very large body of public opinion suspicious of business and sympathetic with government control.

The last election tilted the balance a little toward sympathy with private enterprise—that's all, just tilted it a little. Those in Washingon who favor the business viewpoint are not in position to crack any whips over those with a differing attitude; they may not even be in a bare majority on a showdown.

THESE officials, elected or appointed and regardless of political labels, need a lot more help than just the moral support which is about all they are getting from business generally. If their philosophy is to prevail it must be bulwarked by a renewed confidence in business on the part of their constituents.

If the oil industry is to get what it wants under this—or any other—administration it must work for it vigorously and unceasingly. And under our form of government this means an intelligent campaign of public relations and constructive participation in governmental affairs.

# Shooting for Production

Welex Jet Services Inc. Photo

SELECT CEMENT
TO FIT THE JOB!

● A perforating gun entering the casing — familiar sight in the Oil Fields — is a reminder that, when you shoot for production, the properties and performance of the cement behind that casing are of key importance.

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Even before the quarry blast, raw materials are carefully prospected. Knowing their composition, the laboratory checks and adjusts all raw materials —and checks the finished product as well—to assure the required properties for each type of cement.

Let well conditions decide which cement to use... let trouble-free performance confirm your choice.

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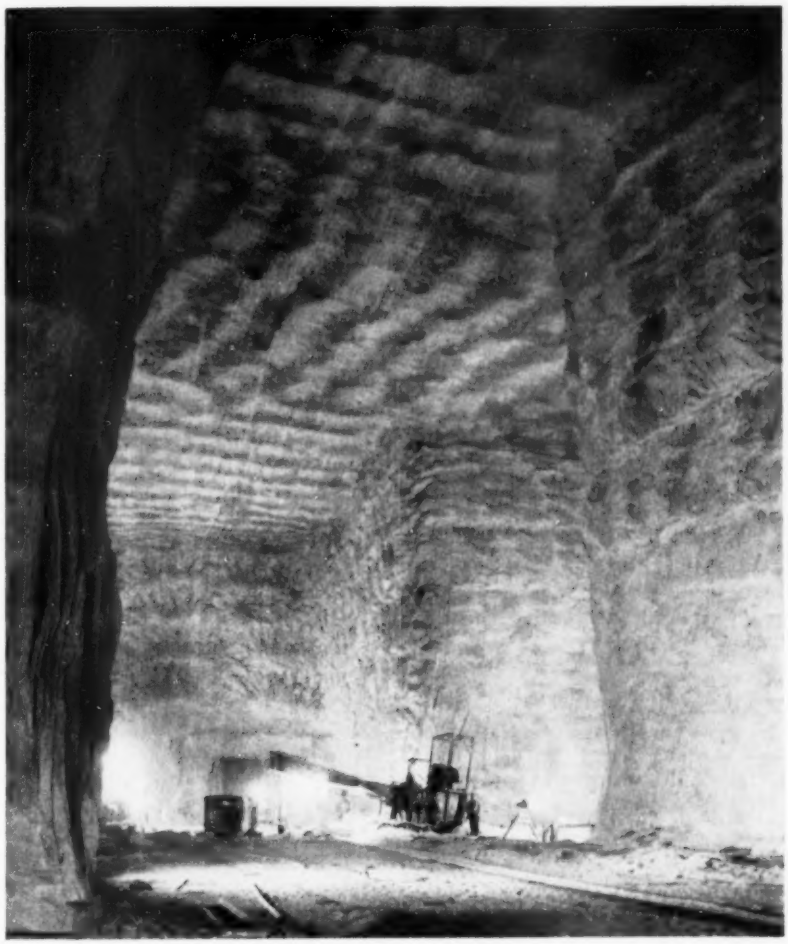
# THIS WEEK



**INSIDE THE SALT DOME where the world's deepest oil production is found. This photograph of salt-mining operations was made in the caverns of the tremendous Weeks Island dome in the coastal marshes of southern Louisiana by a Shell Oil Co. photographer. On the north flank of the dome Shell operates the world's deepest producing well, bringing oil up from below 17,000 ft. The dome, which rises more than 100 ft. above the surrounding marsh, has produced salt since about 1900, but oil was not found on the flanks of the huge geologic phenomenon until 1945.**

**INTERNATIONAL.**—Caribbean Refining Co. to begin construction soon of new 10,000-bbl. refinery near San Juan in Puerto Rico. . . . Plant will process eastern Venezuelan crude and market most of its products locally. . . . ¶Anglo-Iranian follows Gulf action in boosting price of Middle East crude 25 cents a barrel. . . . Increase effective as of July 16. . . . ¶Wildcatting stepped up in Greater Oficina area of Anzoategui in eastern Venezuela. . . . ¶Anglo-Iranian begins erection of first process unit at huge new refinery at Aden. . . . Initial operation of 100,000-bbl. plant is scheduled late in 1954. . . . ¶Finland studying economic feasibility of constructing 9,000-bbl. refinery. . . . It would be the country's first. . . .

**GOVERNMENT.**—Small refiners tell investigating committee that to roll back product prices would put them out of business. . . . Margins were low before the crude price hike, are lower now, and to cut prices would mean disaster, committee is told. . . . ¶Congressmen favoring restrictions on imports begin efforts to push Simpson bill through before Congress adjourns. . . . Bill would put a 10 per cent quota on crude imports, 5 per cent on residual. . . . ¶Barge firms ask Justice Department to revoke the so-called "railroad release letter" which assured U. S. Pipe Line Co. there would be no criminal antitrust action as a result of guaranteed-tender operations of its Baytown, Tex., to Newark, N. J., products line. . . .

**TIDELANDS.**—Texas announces intention to intervene in defense of new submerged-lands law when suit brought by Arkansas to void law is heard in federal District Court in Washington. . . . Opposition to Arkansas' action also voiced by president of National Association of Attorneys General, Harold R. Fatzer of Kansas. . . . ¶Texas to auction offshore oil leases at sealed bid sale September 1. . . .

**NATURAL GAS.**—Texas Railroad Commission says flaring in Spraberry will not be permitted. . . . Statement is answer to Phillips Petroleum Co.'s request that wells be allowed to produce oil 5 days a month whether they have legal gas outlets or not. . . . ¶Texas Atty. Gen. John Ben Sheppard files answer to appeal to the U. S. Supreme Court by Michigan-Wisconsin Pipe Line Co. and Panhandle Eastern Pipe Line Co. over the state's natural-gas-gathering tax. . . .

**ACTIVITY.**—Production of crude and lease condensate averaged 6,494,275 bbl. daily for week ended July 11, up 47,050 bbl. daily. . . . ¶Total well completions for the week increased 14 wells to 1,017 to set a new all-time record. . . . Wildcat completions gained 4 wells for the week to 237. . . . ¶Rotary rigs operating in United States decreased 80 rigs in week ended July 13 to 2,615. . . .

**TRENDS.**—New records were set for refinery runs and gasoline production in the week ended July 11. . . . Refinery runs have been above 7,000,000 bbl. daily for each of the past 7 weeks and averaged above 7,000,000 for the past 12 weeks. . . . ¶The increase of 990,000 bbl. daily in major products stocks for week ended July 11 tended to balance the small increases for the two previous weeks. . . .

**PIPE LINES.**—Continental Pipe Line reveals terms of arrangement whereby it will lay the new 540-mile, 10-in. Yellowstone products line from Billings, Mont., to Spokane, and direct operations of Yellowstone Pipe Line Co., newly formed by Conoco, Interstate Oil Pipe Line, Union Oil, and H. Earl Clack. . . . ¶Ontario Government files brief with Alberta Conservation Board urging that the latter require that gas artery from Alberta field to eastern Canada follow an all-Canadian route. . . .

Yield - Octane Relationship for 10-lb. R.v.p. Products

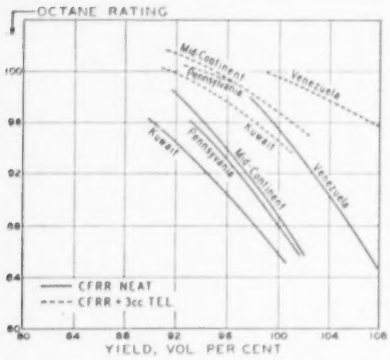



Fig. 1—Four naphthas processed at low pressure with catalyst regeneration.

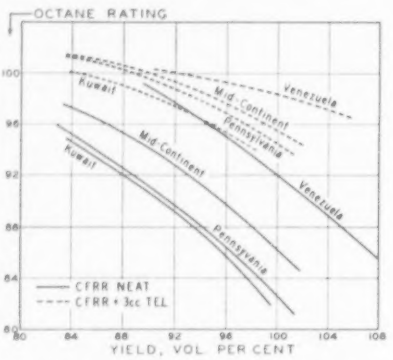



Fig. 2—Four naphthas processed continuously at moderate pressure.

**TABLE 1—FEED-STOCK CHARACTERISTICS**

| | Mid-Continent | Venezuela | Kuwait | Penn. |
|---|---|---|---|---|
| Gravity, A.P.I. | 54.1 | 48.6 | 54.0 | 57.4 |
| I.b.p., F. | 236 | 252 | 240 | 214 |
| 10 per cent | 257 | 273 | 283 | 232 |
| 50 per cent | 291 | 306 | 310 | 260 |
| 90 per cent | 341 | 358 | 337 | 308 |
| E.p. | 373 | 385 | 355 | 336 |
| Naphthenes, per cent | 43.2 | 43.0 | 19.4 | 27.7 |
| Aromatics, per cent | 7.7 | 22.9 | 14.7 | 11.1 |
| Paraffins, per cent | 48.8 | 33.8 | 65.1 | 58.8 |
| Sulfur, weight per cent | 0.021 | 0.032 | 0.087 | 0.072 |
| Research octanes: | | | | |
| Neat | 36.5 | 51.0 | 29.6 | 43.4 |
| Plus 3.0 cc. TEL | 61.0 | 73.0 | 52.5 | 65.5 |

# New-Catalyst Results

## Sinclair claims excellent yield of high-octane product in pilot-plant operations of catalytic reforming process

EXCELLENT yields of high-octane product are being obtained from pilot-plant operations of Sinclair Research Laboratories' new catalytic-reforming process, according to Sinclair technologists.

The process, announced last spring *(The Oil and Gas Journal, April 27, page 131)*, is unusual in its use of a new platinum catalyst.

Sinclair claims two major advantages for the catalyst:

. . . **It maintains** high activity over considerably longer periods of time, resulting in substantially lower catalyst operating costs.

. . . **It has a greater ability** to convert low-octane paraffin components to high-octane aromatic gasoline.

Yields and products specifications obtained from pilot-plant operations with four types of naphthas indicate the expected performance of the process. The data were obtained during runs at the company's Harvey, Ill., laboratories.

The new platinum catalyst was developed in conjunction with Baker & Co., Inc. Termed Sinclair-Baker RD-150, it will be used in the conventional three-reactor fixed-bed unit design.

**Pilot-plant results . . .** Test runs are reported for naphthas from Mid-Continent, Venezuela, Kuwait and Pennsylvania crudes. The catalyst permits operations at low pressure with catalyst

Table 2—Yield and Product Specifications for Continuous and Regenerative Processing

| Process— | Mid-Continent | | | | Venezuela | | | | Kuwait | | | | Pennsylvania | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Continuous | | Regenerative | | Continuous | | Regenerative | | Continuous | | Regenerative | | Continuous | | Regenerative | |
| **Reformate yields:** | | | | | | | | | | | | | | | | |
| $C_5$+, volume per cent | 86.8 | 79.0 | 87.8 | 83.3 | 91.7 | 85.8 | 91.8 | 86.8 | 85.6 | 75.6 | 86.8 | 81.2 | 85.0 | 74.8 | 87.8 | 82.2 |
| 10 lb. R.v.p., vol. per cent | 99.8 | 89.4 | 102.0 | 94.8 | 107.3 | 97.5 | 107.5 | 100.7 | 96.4 | 84.4 | 100.0 | 92.8 | 97.2 | 84.4 | 101.5 | 94.3 |
| **Octanes, Research:** | | | | | | | | | | | | | | | | |
| $C_5$+, Neat | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 | 85.0 | 95.0 |
| $C_5$ + 3 cc. TEL | 94.6 | 99.6 | 94.4 | 99.7 | 95.5 | 99.5 | 95.2 | 99.0 | 94.2 | 99.7 | 93.5 | 99.2 | 96.0 | 99.7 | 95.6 | 99.2 |
| 10 lb. R.v.p., Neat | 86.0 | 94.6 | 85.8 | 94.6 | 86.0 | 94.6 | 86.1 | 94.6 | 85.8 | 94.3 | 85.9 | 94.7 | 85.8 | 94.7 | 86.0 | 94.6 |
| 10 lb. R.v.p. + 3 cc. TEL | 95.3 | 99.8 | 95.3 | 99.9 | 97.2 | 99.7 | 96.2 | 99.4 | 95.1 | 99.9 | 94.5 | 99.4 | 96.5 | 99.9 | 96.4 | 99.4 |
| **Butanes, volume per cent:** | | | | | | | | | | | | | | | | |
| Produced | 4.4 | 6.4 | 2.8 | 4.2 | 2.0 | 4.2 | 1.5 | 2.9 | 4.9 | 8.5 | 3.2 | 4.9 | 5.5 | 8.9 | 2.2 | 4.9 |
| Outside, to 10 lb. R.v.p. | 8.6 | 4.0 | 9.8 | 7.9 | 13.6 | 9.5 | 14.2 | 11.0 | 5.9 | 0.3 | 10.0 | 6.7 | 6.7 | 0.7 | 11.5 | 7.2 |
| **Light gases:** | | | | | | | | | | | | | | | | |
| $C_1$, weight per cent | 1.0 | 1.5 | 0.7 | 0.9 | 0.5 | 1.2 | 0.5 | 0.8 | 1.3 | 2.2 | 0.4 | 1.1 | 1.2 | 1.9 | 0.6 | 1.0 |
| $C_2$, weight per cent | 2.4 | 3.0 | 1.8 | 2.1 | 0.8 | 1.9 | 0.6 | 1.3 | 2.4 | 4.5 | 1.3 | 2.4 | 1.9 | 3.0 | 1.1 | 2.1 |
| $C_3$, weight per cent | 4.5 | 6.5 | 2.6 | 3.6 | 1.2 | 3.1 | 0.8 | 2.0 | 3.5 | 7.2 | 2.1 | 3.4 | 3.7 | 6.7 | 1.9 | 3.6 |
| **Hydrogen, cu. ft./bbl.** | 550 | 740 | 880 | 1,150 | 725 | 683 | 930 | 830 | 510 | 470 | 730 | 875 | 685 | 590 | 910 | 1,150 |
| **Reformate, $C_5$+:** | | | | | | | | | | | | | | | | |
| Gravity, °A.P.I. | 48.0 | 46.7 | 44.9 | 42.3 | 43.1 | 42.1 | 41.9 | 39.6 | 48.9 | 45.5 | 50.9 | | 47.4 | 46.6 | 45.2 | 43.7 |
| I.b.p., °F. | 141 | 138 | 130 | 126 | 158 | 148 | 190 | 150 | | | | | 138 | 134 | | 139 |
| 10 per cent | 220 | 210 | 209 | 207 | 246 | 227 | 252 | 242 | | | 177 | | 208 | 191 | | 200 |
| 50 per cent | 286 | 281 | 285 | 288 | 298 | 291 | 303 | 298 | | | 270 | | 261 | 256 | | 258 |
| 90 per cent | 340 | 352 | 360 | 363 | 362 | 363 | 370 | 378 | | | 362 | | 323 | 328 | | 343 |
| E.p. | 414 | 420 | 448 | 457 | 432 | 440 | 437 | 455 | | | 419 | | 378 | 387 | | 390 |
| Sulfur, weight per cent | .004 | .004 | .005 | .005 | .009 | .005 | .005 | .005 | .006 | .006 | .004 | .004 | .005 | .005 | .006 | .007 |

regeneration, or at moderate pressure under continuous operating conditions.

Table 1 shows the characteristics of four feed stocks tested. Table 2 outlines yields and product specifications for both continuous and regenerative processing conditions.

Under optimum processing conditions promoting aromatics production, 57, 50, and 14 per cent of the $C_6$ fraction in the feed stock is converted to benzene for California, Mid-Continent, and Venezuelan crudes, respectively. Conversion of the $C_7$ fraction in California crude to toluene and xylenes is 55 per cent, and conversion of the same fraction in Venezuelan crude to toluene and xylenes is 44 per cent. Conversion of $C_8$ fractions resulted in 58 and 52 per cent yields of xylenes and $C_9$+ aromatics from California and Venezuela crudes, respectively.

Selectivities for naphthene conversion to aromatics are 83, 92, and 92 for the $C_6$ stock fractions in Mid-Continent, Venezuela, and California crudes, respectively. Selectivities for naphthene conversions for the $C_7$ fractions are 114 for Venezuela crude and 113 for California crude, while $C_8$ selectivities are 118 for California crude and 133 for Venezuela crude. Selectivities and conversions from which they are calculated are based on the assumption that aromatics are synthesized from naphthenes only.

Paraffin cyclizations run 10 and 24 per cent for $C_7$ and $C_8$ fractions in the Venezuela crude, and 25 and 19 per cent for the same fractions in California crude. These values are based on 100 per cent naphthene selectivity.

The data in Table 2 are summarized in the yield-octane curves shown in Figs. 1 and 2, for continuous operation at moderate pressure, and for low-pressure operation with catalyst regeneration.

An agreement has been made between Sinclair, Baker and The M. W. Kellogg Co. under which Kellogg will offer the catalyst in the new process. The first commercial unit is now under construction at Sinclair's Marcus Hook, Pa., refinery. It will have capacity of 16,000 bbl. per day for processing naphtha feed stock and is scheduled for initial operation 1 year hence.

## Monsanto Plans New Lab

ST. LOUIS. — Monsanto Chemical Co. plans immediate construction of a four-story engineering research laboratory at its Nitro, W. Va., plant.

When the new unit is completed in mid-1954, it will be used to carry out research in rubber and agricultural chemicals, oil additives, and synthetic detergents.

# How Oil Men Read

### Journal-sponsored reading tests show writers and ad men scan quickly, but technical men excel in comprehension

TECHNICAL men can read better than executives in the oil industry, it would appear from the results of reading tests taken by 630 visitors to The Oil and Gas Journal booth at the International Petroleum Exposition in Tulsa last May.

Individual scores are now being mailed to all who took the reading tests, which were conducted by experts and machines supplied through the cooperation of the University of Tulsa. The scores were tabulated by the university's reading clinic according to standard methods, and the results have been grouped into seven occupational classifications.

The accompanying table gives the results by occupational groups, and the average for all who took the test at the oil show. The reading efficiency score in the third column is computed by multiplying the rate of reading in words per minute by the percentage of comprehension following the reading, and dividing the results by 100.

As can be seen from the table, persons in journalism and advertising had the highest score of all groups; they read very rapidly, but their comprehension is lowest of all—they're "skimmers."

Students had the lowest score of all, though their rate of comprehension was above average. People in sales work did fairly well, though slightly under the score made by educators. Both technical and administrative groups in the oil industry, it would appear, could well improve their reading ability.

**All above average . . .** All groups, however, are above the national average. Tests have indicated that the average American reads no more than 300 words per minute, and understands only about 75 per cent of what he reads. The tests also show that reading speed has no relation to education or intelligence; highly educated people, being perfectionists, often read only 200 words per minute.

The results of this test are not surprising to persons familiar with adult reading habits. Similar tests of all sorts of groups in many parts of the country have shown that most business men are not very efficient readers but that both their reading speed and their comprehension of what they read can be improved by short training courses.

The Oil and Gas Journal offered this test as a service to its readers and others attending the oil show because of the current widespread interest in improving reading efficiency. A number of oil companies, along with many companies in other lines of business, have discovered that their employes

## Suntide Crude Unit Near Completion

**Construction of the crude unit is nearly complete at Suntide Refining Co.'s new 30,000-bbl. refinery near Corpus Christi. The company now is taking crude (see page 172) preparatory to placing the unit, located in the left foreground of this aerial view of the site, on stream August 1. The 15,000-bbl. catalytic cracking plant may be seen at center.**

## How They Scored

| | Words per minute | Comprehension, per cent | Score |
|---|---|---|---|
| Engineering, technical, and geological | 380 | 80 | 304 |
| Executive, administrative, and supervisory | 371 | 78 | 289 |
| Educators | 406 | 79 | 320 |
| Sales and sales engineering | 391 | 80 | 313 |
| Students | 354 | 80 | 283 |
| Journalism and advertising | 455 | 77 | 350 |
| Miscellaneous | 369 | 79 | 292 |
| Average, all groups | 369 | 79 | 292 |

spend too much time on material they must read, and have sent groups of their executives to reading clinics in their vicinity.

A growing number of universities are offering short courses in efficient reading to the general public as well as to their students, and there are several private organizations engaged in this business. How one such organization functions was described in *The Oil and Gas Journal May 18, 1953, page 250.*

**Clinic swamped . . .** The relatively new reading clinic of the University of Tulsa has already achieved remarkable results in speeding up the reading rate and increasing the comprehension of adults taking its course *(The Oil and Gas Journal, May 11, page 75).*

As a result of the demonstration tests at the oil show, half a dozen or more oil companies in Tulsa have swamped the university with requests for reading courses for their employes. The university is offering a series of 7-week evening courses for adults, and all available places have been reserved for the remainder of this year.

Such reading clinics make up of a number of instruments and mechanical and optical devices to test and improve reading skills. However, both reading speed and understanding of what is read can be improved by self-study without the use of instruments or instructors. Some suggestions on how to do this were given by Prof. Hal Johnson of Case Institute of Technology in *The Oil and Gas Journal, May 18, page 253.*

The widespread interest of companies in giving reading courses to their employes is due to surveys showing that most executives are spending many hours a day reading company reports and other material essential to their jobs and yet many of them complain that they cannot do all the reading required of them. Many people who have taken reading courses have more than doubled their reading speed and also increased their comprehension, and thus greatly increased their working efficiency.

## Industry Briefs

**TOPEKA, Kans. — Washington has** applied for associate membership in the Interstate Oil Compact Commission, according to Gov. Edward F. Arn of Kansas, Compact chairman. Washington would become the fifth associate member state and would bring total membership in the Compact to 26 states.

**LOS ANGELES.—Great Lakes Oil** & Chemical Co. has moved its executive offices here from Grand Rapids, Mich. Company officials say the move was necessitated by the concentration of the company's major oil producing operations in the California area.

**TULSA.—Stanolind Oil & Gas Co.** has granted licenses to three more service companies to carry out fracturing processes for increasing well production. A total of 10 service organizations now use the Stanolind-patented processes. The newly licensed firms are M & K Oil Well Cementing, Inc., Seminole, Okla., Chemical Process Co., Breckinridge, Tex., and Petroleum Service, Inc., Abilene, Tex.

**AUSTIN.—The Texas Railroad** Commission has approved a unitization agreement presented by Seaboard Oil Co. of Delaware for 903 acres on Pennsylvanian canyon reef in Double Mountain field of Stonewall County. Operators plan gas and water injection.

**BARTLESVILLE, Okla. — Phillips** Petroleum Co.'s 245 employes in its production department's western division have completed 2,000,000 manhours of work without a disabling injury during the past 4½ years. The division is composed of the Big Spring, West Texas, Odessa, and Hobbs production districts, and the Odessa service unit.

**LARAMIE, Wyo. — The Wyoming** Geological Association will hold its eighth annual field conference at the University of Wyoming here beginning July 30. The 3-day meet will be highlighted by field trips to the Laramie and North Park basins.

**REGINIA, Sask. — Saskatchewan** Power Corp.'s new 101-mile natural-gas line from Brock gas field to Saskatoon has been completed. J. W. Tomlinson, general manager of the corporation, said backfiling and cleanup operations now are under way. Contract for laying the line was held by Banister Construction Co., Edmonton. Preston-Clarke, Ltd., is laying a gathering system in Brock field. The entire system, including distribution systems in Saskatoon, Rosetown, and Delisle, Sask., is expected to be in operation early in October.

## Journal Wins 11th Editorial Award

THE OIL AND GAS JOURNAL has received honors for editorial excellence for the ninth consecutive year in the annual national competition with other industrial trade magazines sponsored by Industrial Marketing.

The Journal this year was awarded a Certificate of Merit in the "Best Original Research" class. The award was in recognition of the Journal's 1952 Annual Review and Forecast issue.

This year's Industrial Marketing award brought the Journal's number of awards in the past 9 years to 11.

Industrial Marketing, a magazine published primarily for the advertising trade, bases its awards solely on editorial excellence. The annual contest is entered by several hundred industrial magazines, and the top honors are generally recognized as the principal awards made for editorial merit.

For Editorial Excellence
INDUSTRIAL PAPERS
1953
AWARD OF MERIT TO
The Oil & Gas Journal
For outstanding original research published during the period ending December 31, 1952 in the fifteenth annual editorial competition
Conducted by
INDUSTRIAL MARKETING

SMOG CONDITIONS on the Houston Ship Channel stem from operations of a host of plants including 25 refineries and chemical plants.

# Refiners Warned

## Taking steps to abate pollution not enough, plants must keep public informed or expect trouble, committee told

**F. Lawrence Resen**

HOUSTON. — Companies operating refineries and petrochemical plants along the highly industrialized Houston Ship Channel are in for trouble unless they make some noise about the steps they are taking to cut down air pollution.

No matter how hard the companies are working to alleviate the problem, they will be plagued with complaints and criticism and perhaps legal action until they make a concerted effort to tell the public what they are doing.

This, in effect, is what Harris County Judge Robert Casey told members of a Houston Chamber of Commerce pollution committee meeting here to discuss complaints against industry on the channel.

While the ship channel, which along with the city of Houston is located in Harris County, is responsible for the tremendous industrial growth of this area it is also responsible for industrial fumes which irritate nearby residents. Adjacent to this water artery running to the Gulf of Mexico are located—in addition to numerous other types of plants — about 25 refineries, chemical and petrochemical plants whose managers are working to eliminate contamination in the atmosphere. According to Casey, however, they have been working under wraps, keeping the public generally ignorant of their efforts.

Houston's situation is similar to that of many other cities which have seen industrial "fringe" areas suddenly becoming surrounded by homes with the advent of the postwar building boom. The residential expansion, together with a simultaneous surge in construction of new plants on the channel, have made the pollution problem much more troublesome.

**What's being done . . .** A committee set up by the Chamber of Commerce and composed primarily of plant representatives took over the chore of studying pollution abatement in 1950 and during the past 3 years has made real progress in improving the situation so far as pollution of streams is concerned. Meanwhile, a subcommittee has been working more recently on air pollution and has come up with these progressive steps. It has:

1. Made a survey of 90 per cent of the firms in the area to determine what had been done since 1947 to ease the problem. They found that 57 firms alone had allocated more than $13,000,000 since 1947 to cut contamination and that studies were continuing.

2. Set up a group to inform the public by gathering facts and passing them on.

3. Started to evaluate contaminants in the area by making a survey of all plants to determine what is being vented to the atmosphere and in what amounts. This is a tough job since two relatively harmless contaminants could combine under the right humidity and temperature conditions to cause irritating effects. Therefore, the subcommittee is enlisting the technical help of companies along the ship channel to find out what contaminants are present and what should be and is being done about them.

4. Initiated a study into the feasibility of an industry complaint bureau to handle any complaints which might arise in the future. The bureau would insure that complaints are investigated upon receipt, that prompt remedial measures are taken in the case of accident or plant upsets, and that the public is advised.

5. Begun to circulate facts among the local plants on what is being done in other cities to counter similar pollution problems.

**Costs . . .** Installation of corrective facilities is a costly proposition. For instance, a relatively small plant has installed equipment totaling $250,000 to eliminate a rather minor condition and this sum still doesn't take care of all of the contaminants escaping there. Another spent $300,000 on a scrubber system for its acid plant, and, while it has eliminated the particular acid problem, it has reduced plant fumes only about 50 per cent.

Getting rid of the last trace of contaminants is an insurmountable problem, Casey agreed, but he said that if a company were at least trying to solve its problem and made it known, chances are it would have the public's sympathy.

The judge said individual citizens and civic groups have approached him to find out whether the companies intended to do something to cut down the fumes, and, if not, if the county intended to take action.

He said that he felt legal action on the part of the citizens or a governmental agency was not desired or necessary. The committee's work, he said, is well worth while—the trouble is the public isn't aware of it.

# Inshore Areas Active

## Operators continue to discover and develop more oil and gas in shallow bays and bayous of Texas-Louisiana coast

**William P. Sterne**

HOUSTON.—The big battle over ownership of offshore lands has virtually ended, although a couple of states have refused to throw in the towel and plan to continue fighting for federal ownership.

In the meantime, however—as they did when all the legal haggling was going on in Congress over the disputed underwater areas—operators along the Texas-Louisiana Gulf Coast are continuing to find and develop more oil and gas on leases closer to land.

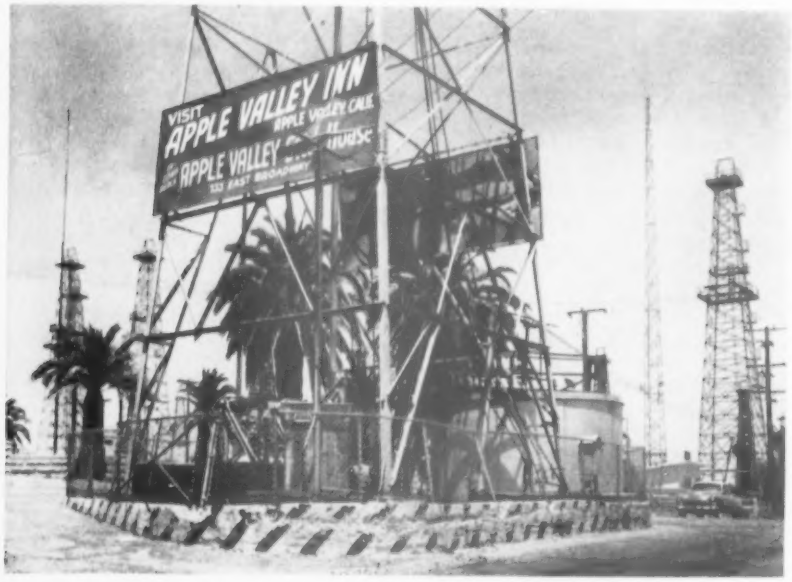
No one, of course, knows just yet what the future will hold for offshore drilling and exploration. In all probability it will increase, although some companies have indicated they may wish to pull out altogether. There seems to be no doubt, however, that activity will remain high in the areas close to shore, which are leased by the states and ownership of which has never been disputed.

This region was active through the period of drilling inactivity further out which began when the Supreme Court ruled the federal Government had paramount rights on the Continental Shelf. Such operators as Humble Oil & Refining Co., Sunray Oil Corp., and Phillips Petroleum Co. have been developing steadily their underwater properties off the Texas - Louisiana coast. Sunray's big Red Fish Bay project is a good example of the prolific fields which lie beneath the shallow bays and bayous of this country.

As an illustration of this activity almost a dozen applications were filed by nine oil companies with the U. S. Corps of Engineers in Galveston and New Orleans during the week ended July 10, for permission to sink drilling barges, build drilling platforms and other related-facility platforms, and to lay underwater gathering lines.

Here, in brief, is what each of these companies is planning in the areas specified:

**Humble Oil & Refining Co.** wants to erect and maintain a number of drilling rigs in Espiritu Santo Bay, off Port O'Connor, Tex. Humble also wants to lay a 2-in. pipe line on the bottom of Galveston Bay, running from a separator platform to a producing well.




### World's Smallest Producing Oil Lease?

**On top of Signal Hill near Long Beach, this well has been producing since May 1937. During this period it has reportedly produced over 300,000 bbl. of oil and currently has an output of about 20 bbl. daily. Size of the lease—as outlined by the steel fence—is 46 by 30 by 26 ft. Keeping all drilling equipment inside the lease boundaries presented quite a problem when the well was drilled. Lacking room for a casing rack, a truck was kept standing by with the pipe. The well was bottomed in a 7-ft. circular target area at 2,600 ft. Bass & Westlund of Apple Valley (which may explain the signs) hold the lease on the pint-sized tract.**

**British-American Oil Producing Co.** is seeking authorization to install casings, buoys, stakes, and detectors for use in connection with seismograph operations in Lake De Cade and Bayou De Cade, and other connecting waterways in Terrebonne Parish, Louisiana. This area is about 3½ miles wide by 5½ miles long, and extends to a point 16 miles southwest of Houma, La.

**Seaboard Oil Co. of Delaware** wants to install seismograph facilities in Four League, Mosquito, and Castagnier bays; in Locust, Little Mosquito, Mosquito, Oyster, Carrion Crow, Little Carrion Crow, and Alligator bayous; and in Lake Chapeau. This over-all area comprises 11 by 10 miles, and extends to a point 25 miles south of Morgan City.

**Sunray Oil Corp.** has requested permission to lay a 2-in. and 2½-in. pipe line below the bed of Corpus Christi Bay to an existing separator platform, and a 16-in. pipe line 2 ft. below the bed of Redfish and Corpus Christi bays to a point 14 miles east of Corpus Christi to a junction with an existing line.

**Sun Oil Co.** wants to lay a 2½-in. line below Copano Bay to a point 5½ miles north from Rockport, Tex.

**Shell Oil Co.** proposes to lay an 8-in. pipe line under Corpus Christi Bay to a point 5 miles south from Aransas Pass, Tex. The line would be placed from a tank battery northwest about 7,700 ft. to a junction with a gas-gathering line.

**Phillips Petroleum Co.** wants to lay a 2-in. pipe line below Copano Bay to a point 7½ miles north from Rockport. The line would run from Well Pano C-2 southwest 3,850 ft. to an existing header platform.

**Sohio Petroleum Co.** proposes to place casings and other structures needed in connection with seismograph operations in Matagorda Bay, extending from Wells Point southwest 10½ miles toward Sand Point and southwest into the bay 3½ miles from mean low tide, and in all of Caracahua Bay, to a point about 15 miles east of Port Lavaca, Tex.

**Stanolind Oil & Gas Co.** is requesting permission to use two alternate types of drilling structures in Copano and Aransas bays at a point 13 miles north from Rockport, Tex. One type of construction will consist of sinking a drilling barge between pilings. The other, to be used nearer shore, wil consist of a shell-fill roadway and drilling base enclosed by a bulkhead. Derrick would be erected 143 ft. high above mean low water.

## Casing Question

### Court must rule it's tubing or a structural-steel shape

HOUSTON. — Testimony now being taken by the U. S. Customs Court here may help decide the question of whether oil-well casing imported into the United States is "a structural shape" or "steel tubing."

A decision, which is expected soon, could mean the difference in millions of dollars to oil companies, importing the casing, since the Government collects 12.5 per cent duty on tubing and only 7.5 per cent on structural shapes.

The battle over the casing-import question already has been partially heard in New York. Judge William A. Eckwall of New York, one of six customs-court judges, convened court here last week to take further testimony, which will be transcribed and submitted to the New York court for a final decision.

About 50 companies which have filed more than 80 similar suits against the Government, stepped aside in order that Humble Oil & Refining Co. could carry on the fight.

Humble is seeking to prove that casing is not just a tube but a "specific structure with highly developed qualities." The company contends the casing is designed "to protect a clear opening from the surface of the earth down to an oil reservoir." Its job, the firm maintains, is to "withstand both internal and external pressure on the hole."

**Old question . . .** The question on specification of casing has been hanging fire for a dozen years. Several years ago, in a test case, the U. S. Customs Court ruled against the Government. However, former Customs Collector Sam D. W. Low, of Houston, declared that the original case had not been properly prepared for the Government, thus setting the stage for a mass protest.

Should the Government win in this case, the oil companies would have to pay an estimated $3,000,000 to $4,000,000 in customs duty.

# ROCKY MOUNTAIN

## New Oil State?

### South Dakota test finds oil in lower Paleozoic

PIERRE, S. D.—A wildcat in west-central, nonproducing South Dakota last week recovered oil on a drill-stem test in lower Paleozoic limestone. The amount of oil was not too encouraging, but electrical surveys were to be made which would determine whether casing would be run and production tests made.

The rank wildcat is Kerr-McGee Oil Industries, Inc., 1 Wallace Cook, 32-13n-22e, located in the Cheyenne River Indian reservation country of Dewey County. The well site is 70 miles northwest of Pierre and about 8 miles due east of the town of Dupree.

Operators confirmed the recovery of 10 ft. of black, 25° to 27°-gravity oil, plus 100 ft. of oil and gas-cut mud, estimated to be 5 per cent oil, on drill-stem test from 5,035-80 ft. The section is believed to be basal Devonian or top of the Ordovician. Following this test, a core from 5,080-92 ft. had no shows except for the bottom 1 ft. which had dead-oil saturation.

The well was drilled ahead and a test run from 5,150-5,230 ft., identified as being in the Red River (Ordovician). It produced fresh water containing 350 p.p.m. of salt and no shows of oil.

A drill-stem test in Winnipeg sand from 5,682-5,722 ft. flowed water with no oil shows. Drilling was stopped at that point.

Electric logs are scheduled and if further oil shows are indicated, casing will be run and tests made.

Carter Oil Co. recovered a pint of free oil while drill-stem testing the Red River section at 8,364-73 ft. in its 1 Hendricks, 2-20n-3e, near the town of Gallup in Harding County and 120 miles northwest of 1 Cook. Carter gave the well up due to mechanical trouble around 8,083 ft. and a twin well 100 ft. north was started as 11-A Hendricks. The latter test was drilling below 7,370 ft. at last report.

## Yellowstone Plans

### Continental will construct jointly owned product line

HOUSTON.—Continental Pipe Line Co. will construct the new 10-in., 540-mile Yellowstone products line from Billings, Mont., to Spokane, Wash., and will direct operations through the staff of the newly formed Yellowstone Pipe Line Co., it was announced here last week.

Ownership of the line, plans for which were first announced last fall by Continental Oil Co., will be shared by that company, Interstate Oil Pipeline Co., Union Oil Co. of California, and the H. Earl Clack interests.

The line will cost $20,000,000. Yellowstone Pipe Line Co. is owned principally by Continental and Interstate, an affiliate of Standard Oil Co. (N. J.), with Union and Clack each owning 10 per cent or less.

It is hoped that the new line will be in limited operation by the end of the year, with final completion scheduled by the summer of 1954. The line will carry products from Continental and Carter Oil Co. refineries at Billings to consumers served by terminals at Bozeman, Helena, and Missoula, Mont.; and Spokane. Continental and Carter terminals at Bozeman, Helena, Missoula, and Spokane are to be in operation late this year.

Initial capacity of the line will be 30,000 bbl. daily of gasoline, fuel oil, and other products. The line is designed to be expanded to transport as much as 50,000 bbl. daily by adding other stations.

**Line route . . .** Route of the line, starting at Billings, will run northwest, passing through or near Big Timber, Livingston, Bozeman, Three Forks, Helena, Garrison, Missoula, Ravalli, and Thompson Falls, Mont.; and Coeur A'Alene, Idaho, with its western terminal at Spokane.

Construction crews are expected to encounter unusually difficult terrain in laying the Yellowstone line over passes in the rugged Rocky Mountains, some of which are more than a mile high in elevation.

One pass through which the pipe line must be laid, for instance, is just west of Helena, and reaches a height of 6,200 ft. Another, near Thompson Falls, is about a mile above sea level.

# WEST COAST

## Production at Record Level

LOS ANGELES.—California crude production in June reached a record level of 1,012,919 bbl. daily.

The new record was due principally to a sharp increase in production at the Navy Department's Elk Hills Naval Petroleum Reserve.

The field's output averaged 19,500 bbl. daily during June, according to preliminary estimates of the Conservation Committee of California. This was 6,000 bbl. daily more than in May, when the state total averaged 1,004,400 bbl.

Next highest contributor to the production increase was Ventura Avenue field, up 3,500 bbl. to an average of 84,200 bbl. daily. Development at Buena Vista, Cat Canyon, and Honor Rancho resulted in production increases in each field of about 1,000 bbl. daily.

## Spraberry Ruling

### No flaring to be permitted, commission tells Phillips

AUSTIN.—A suggestion from Phillips Petroleum Co. that wells in the Spraberry Trend area of West Texas be permitted to produce oil 5 days a month whether they have a legal outlet for gas or not, has drawn a reply from the Texas Railroad Commission that gas flaring will be strictly prohibited under all future orders.

Nonflaring operators are now operating under a July 1 commission order permitting them to produce 9 days during the first half of July. This was issued following a Texas Supreme Court ruling that the commission's order shutting in the entire field was too broad.

It was expected that nonflaring operators would be given additional producing days during the last half of the month. Such a plan is opposed by operators whose gas is not going into a pipe line on the grounds that production by other operators would drain oil from shutdown leases.

**Pipe-line outlets . . .** Pipe lines large enough to handle all of the Spraberry gas will be ready by January, according to Paul Kayser, of El Paso Natural Gas Co., who told the commission the firm's line now has a capacity of 114,250,000 cu. ft. daily, and additions totaling 130,000,000 cu. ft. daily will be completed in November or December.

Also, Permian Basin Pipe Line Co. expects to complete by the end of the year a new Spraberry system which will gather 225,000,000 cu. ft. daily for delivery to consumers in the Midwest. These two lines would amply handle gas capacity for present Spraberry wells.

The commission found, when it ordered Spraberry field shut in on April 1, that 220,000,000 cu. ft. of gas daily was being wasted and only 60,000,000 cu. ft. marketed daily. Production of oil normally averages 85,000 bbl. daily.

## Texas Files Gas-Tax Answer

HOUSTON.—The way is now clear for U. S. Supreme Court action on the Texas natural-gas-gathering tax.

Texas Atty. Gen. John Ben Shepperd filed the state's answer July 8 to an appeal to the court by Michigan-Wisconsin Pipe Line Co. and Panhandle Eastern Pipe Line Co. to strike down the tax on the basis that it is a burden on interstate commerce and therefore unconstitutional.

Records in the case now can be forwarded to the Supreme Court from the state's Third Court of Civil Appeals here.

The state's answer argued that the courts consistently have upheld the right of states to place nondiscriminatory taxes "upon a local incident or activity of the interstate business, which is separate and apart from the actual flow of commerce, provided the taxpayer is receiving from the state levying the tax, benefits, protection, or opportunities which bear a fiscal relationship to the tax."

## Conservation Pact Approved

WASHINGTON.—State authorities of Texas and New Mexico have approved an agreement between the United States and Mexico for the application jointly of conservation practices to oil and gas fields straddling the border.

No response has yet been received, however, to a State Department request for the views of Arizona and California authorities.

The question of an international agreement on border fields was raised last winter and the State Department has been studying the matter. Currently the field being produced on both sides of the border, is a gas field in Texas.

Under the proposed agreement, the authorities of the state concerned and the Mexican authorities would work out a conservation program to be applied to a field on both sides of the border, eliminating unnecessary drilling to prevent drainage and getting maximum recovery from pools.

## Woodlawn Properties Sold

HOUSTON.—Hollandsworth Oil Co., of Longview, and Bracken Oil Co., of Tyler, Tex., have acquired the Woodlawn field production of the former Kemp Drilling Co., Dallas.

According to reports in Marshall, Tex., Hollandsworth purchased 75 per cent of the Kemp production, and Bracken 25 per cent.

Acquired in the transaction were interests in the 89-acre Reed and Bintner land, three wells on the Mrs. Dolly Bell Key 891-acre tract in Marion County, the Jodie Bender Unit, and riverbed and railroad right-of-way interests.

## Texas Enters Fight

### Legal department to help defend tidelands law

AUSTIN.—Texas Atty. Gen. John Ben Shepperd has offered the full assistance of the state's legal department to federal officials who will defend the recently enacted submerged lands act in an upcoming court fight.

Constitutionality of the new law returning submerged offshore lands to coastal states is being tested in a suit brought by Arkansas. Shepperd stated that Texas will intervene formally or file briefs upholding the legality of the law when the Government files its response to Arkansas' charges—which must be done by mid-September.

**N.A.A.G. help pledged . . .** Additional opposition to the Arkansas petition has been voiced by the president of the National Association of Attorneys General, Harold R. Fatzer of Kansas. Fatzer assured Shepperd that the group will support the tidelands law. However, Arkansas Atty. Gen. Tom Gentry is reported to have received support from several members of the association in his state's attack on the law.

In its petition Arkansas charges that the law is "unconstitutional," null and void . . . in that it is an unwarranted and invalid attempt to abdicate the sovereignty of the United States to a few of the states."

The case will be tried in a Washington, D. C., federal District Court.

## Tidelands Lease Sale Set

AUSTIN.—Texas will sell tidelands leases for the first time since the submerged lands act became law at a sealed bid sale September 1.

Originally the sale had been set for December 1, but the Texas School Land Board decided to offer some gulf tracts in face of a suit brought by Arkansas attempting to set aside the new law recognizing state ownership of the submerged lands. Another sale is planned early in December.

Texas had its last sale of gulf leases in 1947 which brought bonuses averaging $20 per acre plus rental and royalty. About 160,000 acres were leased within what is now the state boundary, and about 145,000 acres were leased in the outer Continental Shelf. Status of these latter leases, which are in areas still controlled by the federal Government, is not certain.

The state has more than 2,500,000 acres in the gulf which can be leased.

# Price Collusion Denied

## Independent refiners brand charges as ridiculous, warn Congress forced rollback might put them out of business

**Bertram F. Linz**

WASHINGTON. — Independent refiners warned the House commerce committee last week that "in its enthusiasm to protect the public from what it thinks is a great wrong" it may put all of the independents out of business by forcing the revocation of recent crude and products price increases.

Even those refiners who produce only a negligible portion of their crude requirements and are forced to buy 90 per cent or more of their oil supported the crude-price increase.

In addition to the increased cost to consumers of $500,000,000 a year estimated by oil-company officials if the higher prices are maintained, the committee received testimony that they will cost the military $50,000,000 and that if all Middle East companies follow Gulf and Anglo-Iranian it will cost European consumers $131,000,000.

The increase in product prices was defended by figures demonstrating that the refiners, for the past 6 years, have been absorbing steadily increasing costs of labor and materials and have reached the point where they cannot take more.

Appearing before the committee were Roland V. Rodman of the Anderson-Prichard Oil Corp., Oklahoma City, president of the Western Petroleum Refiners Association; Paul Blazer, Ashland Oil & Refining Co., Ashland, Ky.; Reid Brazell, Leonard Refineries, Inc., Alma, Mich.; J. B. Smith, Vickers Petroleum Co., Wichita; T. A. Helling, El Dorado Refining Co., El Dorado, Kans.; and Elmer T. Batzell, counsel for the Independent Refiners Association of America.

**Strong defense . . .** Between them, these witnesses rebutted every allegation made by members of the committee from consuming areas in their apparent effort to discredit the industry.

The increase in the price of crude was designed to encourage new discoveries, they asserted, Rodman pointing out that "history has demonstrated that the amount of crude reserves developed is directly related to price and market."

There was no collusion in the industry in raising prices. Had there been, Blazer declared, "a few leaders could get together and handle the price changes in a way which would tend to disarm suspicion."

The product-price increases were long overdue, the refiners testified. But present prices are shaky and may not hold, they admitted. In some areas increases announced by major or independent refineries have had to be reduced because of competitive factors, and pressures for lower prices have been generated by the committee's investigation.

**Still hurting . . .** Except for the companies which have a large crude production of their own and to that extent benefit by the increase in crude prices, refiners have been unable to increase their product prices to more than offset that increase and in many cases have not been able to accomplish even that.

"We feel that product prices were too low before the crude-price change and should have been or should now be further increased to take care of our increased labor and material costs," Helling told the committee. "Our financial obligations cannot be met from the net earnings we now have."

The refinery spokesmen explained in detail how the industry has constantly striven to give the public better products at less money. This has been done, they said, at heavy costs which are difficult to recover. To hold their place in the industry, many independent refineries have been forced to purchase new equipment at the cost of $2,500,000 to $4,000,000 for a catalytic cracking unit and $1,000,000 for a Platforming unit.

**Reserves slipping . . .** Since the last crude-price increase in December 1947, it was testified, our population has increased from 142,000,000 to 158,000,000; domestic demand for crude has increased 49 per cent from 1,792,786,000 to 2,664,977,000 bbl. a year; and per capita consumption has gone from 12.6 to 16.8 bbl. Proved crude reserves, however, have increased only 30 per cent, and new reserves are not being added at a rate sufficient to meet peacetime demand.

Costs have increased all along the line, but the Korean emergency and its attendant controls prevented oil prices from keeping pace, although the Government was less rigorous in its treatment of other commodities. In the 2-year period crude petroleum advanced only 0.8 per cent while all commodities generally advanced 16.7 per cent. The inevitable result, the committee was told, was that drilling activity slackened off.

"These are the elements that caused us to reach stagnation in drilling in

### Three Lines in One Ditch in North Dakota

**Workers here are under way on the wet-gas gathering system which will serve Tioga and Beaver Lodge fields and move gas to Signal Oil & Gas Co.'s gasoline plant near Tioga for liquids extraction. The plant is now under construction. The 24-in. pipe shown here is a part of the gathering system, which ranges in pipe size up to 34 in. in diameter. In the center is a 6-in. line which will return plant residue gas to the fields as lease fuel, and at left is a 3½-in. "drip" line. This small line will pick up liquids accumulating at low points and move them to a high point where they can reenter the gas line for movement on to the gasoline plant.**

1952," Rodman asserted. "Price is the only sound method of correction.

"Persons unfamiliar with the petroleum industry have indicated that perhaps an increase in crude was justified but that the refining branch of the industry might well absorb the increase.

"Such a viewpoint is not only bad from the standpoint of a free economy but it would be unmoral and impossible."

Outlining the situation of members of the Independent Refiners Association of America, Batzell told the committee "there is no mystery to the increase in product prices by the independent refiner."

"He had to increase prices if he were to stay in business," Batzell declared. "Perhaps he should have increased them more, and in instances he tried to, but the operation of consumer resistance quickly forced the prices back to a lower level."

**Margins low . . .** Refinery margins are lower than those of either jobbers or fillings stations, Batzell said, and when crude prices were increased refiners had no alternative but to proportionately increase the price of their products.

"It is perfectly apparent that such price adjustments as have recently been made were an inevitable and necessary step to maintain the life of the independent refiner," Batzell contended. "It is equally apparent that adjustments thus far made have done nothing to relieve the independent refiner of the heavy cost burden which he has in increasing measure been subjected to since the outbreak of Korea. In fact, he has not been able fully to recover the added costs of his crude and as a result he finds himself in an even worse position than he was at the time the crude increase was announced.

"The refining segment of the industry remains in a precarious position and it must be anticipated that further increases will have to occur through upward price adjustments if the refiner is to maintain the contribution which he has heretofore made to the development of new and better products for the ultimate consumer."

Meeting tacit suggestions that the independents might increase their prices while those of the major companies were kept static, Brazell told the committee "it just doesn't work that way" and if they tried it the independents "wouldn't last 2 weeks."

**Not afraid of majors . . .** In the testimony of Brazell and Blazer the committee got an insight into the way the independents view the majors.

The independent is a prod in the side of the large companies, Brazell asserted.

"We independent refiners do not fear the major oil companies as long as their competition is developed in a free atmosphere," he said. "We know that because of our flexibility we can outmaneuver them at every turn in the road if we are free to plan our own strategy. Secondly we know that the major oil companies are too busy fighting with each other to pay more than passing attention to us.

"We do have great fears and doubts, however, of some who profess to be the friend of everyone, individuals and corporations alike. Those fears are of the Government itself — specifically Congress.

"This committee, I am sure unwittingly, in its enthusiasm to protect the public from what it thinks is a great wrong is about to accomplish something that no other force has been able to do, that is put all of the independents out of business.

"We have great faith in our Congress and the men and women that make up those bodies. We do not think that with the facts before you, you will permit anything to happen that will jeopardize the independent businessmen."

**Danger of subsidization . . .** There is danger that the larger integrated companies may use the extra profit derived from the crude advance to subsidize their refining and marketing operations during the prospective period of faltering advances of refined products, Blazer said. Ashland Oil & Refining Co., he testified, has lost more than 1,000,000 gal. a month of railroad diesel business which was taken away from it on a year's contract by a major oil company which did not follow the products-price advance.

"There are large oil companies," he cautioned the committee, "which probably wouldn't feel too badly if, through congressional criticism and the pressure of public opinion, they were induced to drop back on the prices of gasoline and other refined products without making a corresponding reduction in the price of crude oil. That would put real pressure on the refining branch which already has been struggling with steadily diminishing margins of profit. Such a situation would be disastrous to the independent refiners.

"From the standpoint of the public, one of the worst things that could happen would be for the independent refiners and their customers, the independent distributors, to be crippled by a squeeze caused by an increase in the price of crude oil without a corresponding increase in the price of refined products," Blazer said.

During the appearance of the refiners, Rep. John B. Williams of Mississippi told Congressman Heselton of Massachusetts, presiding in the absence of Chairman Charles A. Wolverton of New Jersey, that he felt the industry had made a case and suggested that, unless there was evidence to controvert it, there was no point in continuing the hearings. Heselton, however, indicated he was merely carrying out the instructions of the chairman and suggested the proposal be raised when he was present.

**Added defense burden . . .** Petroleum products account for 2 per cent of all expenditures for military defense and the higher prices will add $50,000,000 to the Defense Department's $1,000,000,000 oil bill during this fiscal year, the committee was told by Brig. Gen. A. H. Johnson, chairman of the Munitions Board petroleum committee, and Col. Douglas Brown, executive officer of the Armed Services Petroleum Purchasing Agency. The increase would be greater, they testified, except for the fact that a large part of the military requirements for the next 6 months was committed before the price increases occurred.

Brown testified that ASPPA buys in excess of 200,000,000 bbl. of products a year on varying forms of contracts, some of which have escalator clauses linked to the price of crude. With one exception, contracts are limited to 1 year or less, the exception being a long-term contract with Caltex for oil for Korea from the Middle East. That is the only long-term contract the department has ever made, and it will not be renewed when it expires, Brown said. It has been in effect through most of the period of the Korean war and, by reason of lower prices and shorter haul, the Government has saved $75,000,000.

Product prices were increased in Europe following the increases here, it was reported by Cornelius J. Dwyer, chief of the petroleum branch of the Mutual Security Agency.

The increases will result in additional costs to European consumers of $12,000,000 on products imported from dollar sources—$3,000,000 on United States and Venezuelan crude and $3,000,000 on Far Eastern products.

So far, Dwyer said, only Gulf and Anglo-Iranian have raised their prices for Middle East crude, but if all other Middle East companies follow suit the additional dollar cost will be another $30,000,000.

During the current fiscal year, the Marshall Plan countries will import $443,000,000 worth of dollar oil, of which MSA will finance $11,000,000, plus $3,600,000 for Yugoslavia. Oil is the biggest single dollar commodity imported by Europe, Dwyer said. With allocations from the 1953 fiscal year still unfilled, MSA's contribution for oil during fiscal 1954 will total $90,000,000, he disclosed.

**New price structure? . . .** Dwyer explained that whereas here the price of products is tied to the cost of crude the pricing pattern in Europe is entirely different. The relationship between crude and product prices in the Mediterranean has not reflected the actual supply situation for some time. Partly as a result of too high a spread, there has been overexpansion in that area, and price-cutting has occurred with signs that a new price structure may be in the making.

It is also possible that world prices for the more valuable products may not remain tied to United States prices, Dwyer predicted. Since the United States now exports only relatively small quantities of motor gasoline and the high import tax precludes its import, he explained the domestic market for gasoline may become isolated from the world market and different levels of prices eventually may be reached for gasoline and other higher-priced products in the outside world and in the United States.

Dwyer expressed some doubt that Middle East crude prices will rise, pointing out that since the Middle East crude supply is recognized to be abundant and demand for products is still restricted in most European countries to conserve foreign exchange, strong resistance to any general increase in the price of Middle East crude could be expected in Europe. The American companies, in particular, would encounter serious difficulties in obtaining the additional dollar exchange, he said.

**State laws an aid . . .** State conservation laws have not been manipulated to fix prices but have served to avoid monopoly in domestic production by making it possible for small operators to compete, it was asserted by Russell B. Brown, general counsel of the Independent Petroleum Association of America.

Brown submitted detailed statistical data showing how costs of material and labor have increased since 1947, and explained how in the face of rising costs and static prices it has been possible for the industry to operate and even show an apparent profit.

Replacement operations are a big part of production activity, taking something like 60 cents out of every dollar of sales, a situation that does not apply in any other industry, Brown pointed out.

"Through the sale of crude oil found and developed at relatively low cost many years ago," he explained, "oil companies show in their financial statements a substantial profit that does not take into account the current cost of replacing this oil. It reflects merely in-

# WATCHING WASHINGTON

**Bertram F. Linz**

## Manpower at a Premium

The depression 30's are beginning to take their toll in shortages of skilled and trained manpower.

For some years to come the low birth rate of the depression era will be the cause of lack of adequate scientific and technical personnel for the oil and other industries and the Armed Forces, it is warned by the National Planning Association.

With industrial needs for trained men and women increasing at an accelerating rate it will be a long time before the supply becomes adequate. Even the "bumper baby crops" of the 1940's will not fill the gap because preceding decades produced too few teachers and too few researchers to train them in sufficient numbers, the association believes.

The military services are becoming as technical as industry, and study indicates that in the event of a war in the next few years the nation's supply of skilled workers would quickly be depleted.

The National Planning Association is not alone in its concern over the manpower situation. Civilian government officials and the military have been giving the matter great thought. All agree that the full potentials of the nation's young people must be developed and used wisely if the country is to avoid dangerous wastes of manpower. How to accomplish this is the big problem.

## Old Fight Not Over

Interests which unsuccessfully fought against return of their tidelands to the states predict that the legislation recently enacted by Congress will touch off a series of interstate controversies which will not be resolved for years.

The first of these disputes is said to have already arisen between Texas and Louisiana, involving something like 11,000 acres of potential oil lands in the Gulf of Mexico.

Louisiana, according to reports to Washington, claims that the Louisiana purchase of 1803 fixed its boundary at the west bank of the Sabine River and thence due south into the Gulf. Texas asserts that the boundary follows the middle of the river and thence southeast into the Gulf.

Arguments such as these will not affect the relationship between the coastal states and the federal Government, settled when Congress said the states owned everything within their historic seaward boundaries. But that act itself has been challenged in the courts in what may be the first of a whole series of suits to have the law declared unconstitutional.

Between the controversies among the states, which may result in litigation and the attacks on the federal statute, the courts may be kept busy for several years to come in the tug of war for the oil resources of the submerged lands.

## Interagency Shuffle?

The Bureau of Land Management may be transferred from the Interior Department to the Department of Agriculture, or the Forest Service may be moved from Agriculture to Interior in a reorganization of government agencies which may be worked out over the next few months.

The aim of the shift would be to centralize the work of administering the government-owned lands. However, both Interior and Agriculture have potent arguments why they should not lose the agencies they now have, but should be permitted to take over the other's.

Except for the claims of Agriculture that there are particular responsibilities involved which tie in with other department activities, the Forest Service could probably be transferred to Interior easier than the Bureau of Land Management, with its oil and gas-leasing responsibilities, could be made a part of Agriculture.

Over the years there have been some differences between the two departments because the activities of one lapped over into those of the other. There is oil in some of the forest areas and agricultural values in some of the land under Interior's control.

In view of the fact that the Bureau of Mines and Geological Survey oil activities serve to complement the leasing work of the Bureau of Land Management, it is not believed that either the Interior Department or the oil and gas industry would like to see the BLM transferred to Agriculture bodily.

ventory appreciation and not real profit. The net effect as far as reported profits of oil companies is concerned is a serious overstatement of real earnings.

"The steady increase in replacement costs of crude oil will not be reflected in the financial statements of oil operators for many years. If these increased replacement costs are not reflected in the price of oil, however, the industry will be unable to maintain its oil supplies and will be in the process of liquidation."

## Product Stocks Drop

### Secondary inventories as of June 1 under last year

WASHINGTON. — Secondary inventories of major products at the close of May were slightly below those of the corresponding date last year, the Census Bureau reported last week.

The bureau estimated that 44,310,000 bbl. of gasoline, kerosine, distillate fuels, and residual oil were in secondary storage May 31, compared with 44,453,000 bbl. on the same date in 1952.

Gasoline inventories of 19,930,000 bbl. were somewhat below the 1952 total of 20,263,000 bbl., and residual fuel stocks were down to 5,449,000 bbl. from 5,815,000 bbl. Kerosine inventories were 5,934,000 bbl. against 5,857,000 bbl., and distillates were up to 12,997,000 bbl. from 12,518,000 bbl.

Although below the 1952 level, total inventories showed an increase of 244,000 bbl. from April 30, when they amounted to 44,066,000 bbl. A substantial drop in gasoline stocks, 1,289,000 bbl. from 21,219,000 bbl., was more than offset by gains of 469,000 bbl. in kerosine, from 5,465,000 bbl.; 418,000 bbl. in distillates, from 12,579,000 bbl.; and 646,000 bbl. in residual, from 4,803,000 bbl.

Secondary storage capacity on April 30 in PAD Districts 1, 2, 3, and 4 amounted to 86,300,000 bbl. The bureau estimated this storage was approximately 47 per cent filled as of April 30.

Secondary inventories by districts as compared with previous periods are shown in the accompanying table.

**SECONDARY INVENTORIES OF MAJOR PRODUCTS**

(Thousands of barrels)

| | May 31, 1953 | April 30, 1953 | May 31, 1952 |
|---|---|---|---|
| Gasoline: | | | |
| Dist. 1 | 5,243 | 5,698 | 5,093 |
| Dist. 2 | 8,750 | 9,394 | 9,306 |
| Dist. 3 | 2,838 | 3,017 | 2,784 |
| Dist. 4 | 1,003 | 988 | 894 |
| Dist. 5 | 2,096 | 2,122 | 2,186 |
| Total | 19,930 | 21,219 | 20,263 |
| Kerosine: | | | |
| Dist. 1 | 2,342 | 1,958 | 2,294 |
| Dist. 2 | 2,596 | 2,484 | 2,696 |
| Dist. 3 | 812 | 826 | 656 |
| Dist. 4 | 89 | 92 | 97 |
| Dist. 5 | 95 | 105 | 114 |
| Total | 5,934 | 5,465 | 5,857 |
| Distillate: | | | |
| Dist. 1 | 6,007 | 5,541 | 5,743 |
| Dist. 2 | 4,329 | 4,290 | 4,280 |
| Dist. 3 | 1,046 | 1,118 | 805 |
| Dist. 4 | 459 | 462 | 410 |
| Dist. 5 | 1,156 | 1,168 | 1,280 |
| Total | 12,997 | 12,579 | 12,518 |
| Residual: | | | |
| Dist. 1 | 3,864 | 3,402 | 4,317 |
| Dist. 2 | 950 | 903 | 834 |
| Dist. 3 | 545 | 418 | 482 |
| Dist. 4 | 6 | 5 | 6 |
| Dist. 5 | 84 | 75 | 176 |
| Total | 5,449 | 4,803 | 5,815 |
| Major products: | | | |
| Dist. 1 | 17,456 | 16,599 | 17,447 |
| Dist. 2 | 16,625 | 17,071 | 17,116 |
| Dist. 3 | 5,241 | 5,379 | 4,727 |
| Dist. 4 | 1,557 | 1,547 | 1,407 |
| Dist. 5 | 3,431 | 3,470 | 3,756 |
| Total | 44,310 | 44,066 | 44,453 |

## Construction Under PAD

WASHINGTON. — Oil and gas projects valued at more than $5,785,000,000 were approved for construction or completion by the Petroleum Administration for Defense during the 2 years ended June 30.

Applications for approval of facilities valued at another $1,706,000,000 were denied, canceled, deferred, or returned without action—many of them in the second quarter of this year because of the imminent end of the Controlled Materials Plan.

A report on the work of PAD between June 11, 1951, when Form PAD-26 was adopted to provide priorities assistance for expansion projects, and June 30, 1953, showed that 7,025 original applications and 2,319 amendments were received and 6,349 original cases and 2,189 amendments were approved.

Deputy Petroleum Administrator Joseph A. LaFortune pointed out, however, that these figures do not necessarily cover all of the expansion projects of the oil and gas industry during the period, since some operators did not require priorities assistance for purchases of construction materials.

LaFortune released a breakdown of the $5,785,254,497 of construction approved by PAD, showing that gas accounted for $2,392,965,696; refining $1,619,527,898; supply and transportation $1,244,851,953; natural-gas production and processing $437,301,276; marketing and distribution $25,895,588; and production $64,712,086.

## Imports Curb

### Quota backers trying to push law through quickly

WASHINGTON.—Efforts are being made to push revision of the Reciprocal Trade Agreements Act, including quotas on oil imports, through Congress before adjournment of the session.

The Simpson bill, providing for a 10 per cent quota on oil imports generally and a 5 per cent quota specifically on residual fuel oil, has been favorably reported by the House ways and means committee, which declared the country today is facing a "basic problem" in the "choice between dependency versus self-sufficiency with respect to domestic oil supply."

"The danger that the United States will incur in failing to develop adequate domestic supplies of petroleum and in placing ever-increasing dependence upon foreign sources for its basic supplies cannot be overemphasized," the committee asserted, pointing out that one of the effects of increased imports in recent years has been to curtail the search for new fields.

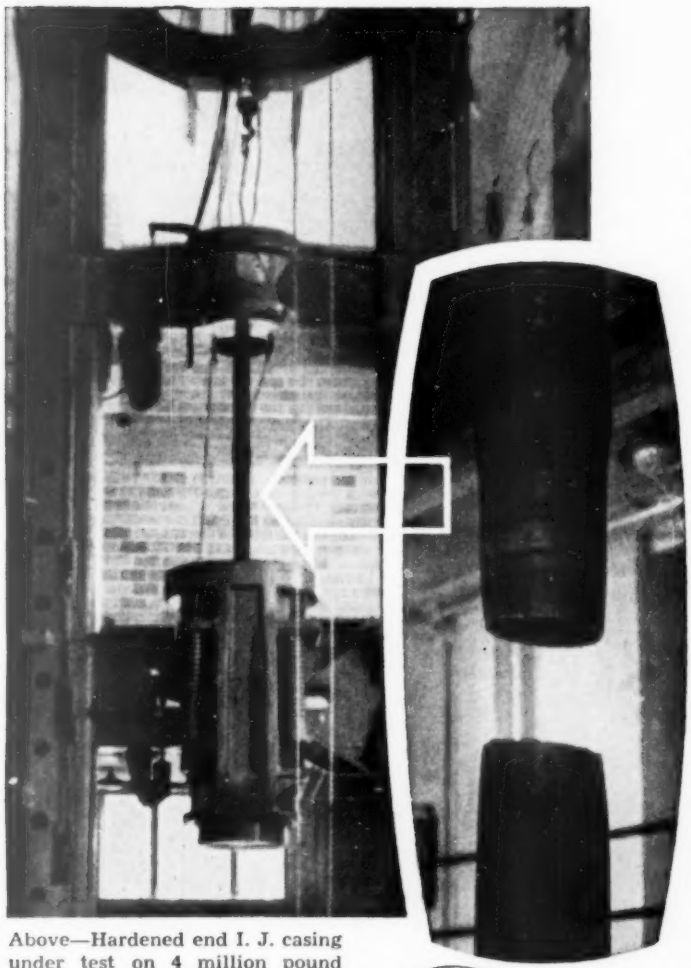
The proposed 10 per cent quota would not shut out oil imports, the committee said. If applied during this year, it would permit between 700,000 and 800,000 bbl. daily to enter the country.

**Increased dependence . . .** Pointing out that foreign oil operations are under the control of five American and two foreign companies, the committee warned of the possible ill effects of continued unregulated imports.

"As these few companies increase imports they acquire a stronger and stronger control over the domestic market and the United States becomes more and more dependent upon these companies for both its peace-time and and war-time needs," the committee's report declared. "Moreover, such concentration of control in the hands of a few corporations threatens the existence of the many small independent companies whose continued vitality is essential to the maintenance of a healthy and competitive domestic oil industry.

"This situation raises the question as to whether it is wise in the long run to place the American consumer and the national security in the hands of a few large oil companies who are sub-

# EXTRAS *that make it* BETTER



Above—Hardened end I. J. casing under test on 4 million pound testing machine at University of California. Closeup at right—Note that tested pipe broke in body, away from threaded connection.

## *Hardened Ends and API Threads on Youngstown Deep Well Casing*

YOUNGSTOWN casing - Integral Joint and Threaded and Coupled - is produced with heat treated ends to meet the higher requirements of deep well drilling. The advantages are:

1. Controlled heat treating of ends assures homogenity of structure throughout the pipe wall.
2. Hardening makes upsets unnecessary, thus eliminates obstructions on the internal surface of the casing.
3. High joint strengths - meeting requirements of API Bulletin 5A-1 - are proven by repeated tests.
4. Integral joints improve long strings by eliminating half the threaded joints. Simplification also results as the same thread can be used for an entire string, heat treated on top, untreated on bottom. No crossover joints required.

For data on actual performance in the field, write or phone the nearest Youngstown District Sales Office.

QUALITY YOUNGSTOWN SERVICE

# Youngstown

## OIL COUNTRY TUBULAR GOODS

**THE YOUNGSTOWN SHEET AND TUBE COMPANY** *Manufacturers of Carbon, Alloy and Yoloy Steel*

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PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES

**Wire Rope at Work**—As you draw near New York City at the northern end of the 118-mile New Jersey Turnpike, this is the bridge that carries you high above the Passaic River. The picture, taken at a time when the bridge was near completion, shows two 146-ton girders for the main span being lifted simultaneously into place by Bethlehem Wire Rope.

These heavy steel girders made a tough lift, but no tougher than thousands of others entrusted to Bethlehem rope all over the country. Wherever there are heavy lifting or hauling jobs to be done, you will find Bethlehem rope right in the thick of things, hard at work. You will always know it by the black-and-yellow reel, the reel that tells you, "Here a good product is in service."

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

*Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:*
MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

jected to strong economic and political pressures from abroad."

The smaller quota on residual, the committee said, is necessary to support the domestic coal and railroad industries, and again is necessary in the light of "enlightened self-interest."

## Monopoly Alleged

### Barge firms protest U. S. Pipe Line operating plan

WASHINGTON.—Revocation of the so-called "railroad release letter" approving plans of the U. S. Pipe Line Co. for "guaranteed tender" operation of a products line from Baytown, Tex., to Newark, N. J., was asked of Atty. Gen. Herbert Brownell last week by counsel for four barge operators who asserted the pipe line would be an "illegal monopoly."

A "railroad release letter" is a memorandum by the Department of Justice giving advance assurance that no criminal prosecution will be brought under the antitrust laws with respect to a program of operation outlined therein.

The projected pipe line would have an initial capacity of 300,000 bbl. per day of products to be transported from Texas to New Jersey by way of Memphis, Louisville, Cincinnati, and Pittsburgh for shippers signing 5-year contracts. It is being opposed by River Co., Inc., and Chotin Towing Corp., New Orleans; Commercial Petroleum & Transport Corp., Houston, and Greenville Towing Co., Inc., Greenville, Miss., who also have an injunction suit pending in the New York federal District Court.

**Threat to barges . . .** The barge interests charge the pipe-line company is seeking to monopolize Gulf-Ohio Valley transportation by entering into guaranteed-tender contracts obligating shippers to ship a minimum daily volume, which they contend would prevent barge operators from competing for this business for 5 years. At the same time, the service requirements and the long-term guarantees would prevent small independent companies from signing transportation contracts and thereby exclude them from competitive access to the line.

Under the requirement for minimum tenders of 50,000 bbl. segregated and 30,000 bbl. on a commingled basis, the barge lines charged, the benefits of the pipe line would accrue principally to the major oil companies and would not be available on competitive terms to independent refiners and marketers.

The release letter was issued by the department in October 1952 without the barge interests having been accorded an opportunity to present their views, and a protest was filed immediately.

## Oil-Acreage Bill Introduced

WASHINGTON.—A bill has been introduced by Senator Barrett of Wyoming to raise the amount of government-lands acreage which may be leased or optioned for development by a single party in one state.

The measure proposes the amount that could be leased be increased from 15,360 acres to 46,080 acres, and the amount that could be optioned from 100,000 to 200,000 acres.

Also, the bill would permit option terms to be increased from 2 to 3 years.

## Federal Leases to Be Sold

WASHINGTON.—Oil and gas leases on lands in the known geologic structure of fields in New Mexico and California will be sold by the Bureau of Land Management this month to the qualified bidders of the highest cash bonuses.

Bids will be opened July 22 on four leases in New Mexico, three of them in the Pecos Valley field and one in the Red Lake field. A lease will be sold on land in the McKittrick Front field in California July 29.

# CANADA

## Canadian Route Urged

TORONTO. —The Ontario government has sent a brief to the Alberta Petroleum and Natural Gas Conservation Board urging that the projected natural-gas pipe line from Alberta to eastern Canada follow an all Canadian route.

The Alberta board currently is hearing applications for construction of the line.

Leslie Frost, premier of Ontario, said the provincial government favors the route north of Lake Superior because the gas would accelerate the growth of "power hungry" northern Ontario.

Estimates so far of the cost of construction of the all-Canadian line peg it at about $315,000,000. This is about $20,000,000 above the estimated capital required to lay the line south of Lake Superior generally paralleling the Interprovincial and Lakehead crude pipe-line systems.

Applicants in the Alberta hearing now have been pared to two: Trans Canada Pipe Lines, Ltd., backed by Canadian Delhi Oil, Ltd., and Western Pipe Lines, Ltd.

Trans Canada plans a line from southern Alberta north of the lakes to Ontario and Quebec. Western would lay a line east to Winnipeg, Man., thence south to serve the St. Paul-Minneapolis area in the United States. It would be extended later to serve eastern Canada.

An application to lay a line along a route similar to that proposed by Trans Canada recently was dropped by Northwest Natural Gas Co. *(The Oil and Gas Journal, June 22, page 151.)*

Another application by Mid-Continent Pipe Lines, which will not be heard at the present hearing, proposes a line following a southern route through the United States to Ontario and Quebec.

## Bids for Plant Rejected

EDMONTON, Alta.—The government of Alberta has rejected all bids received on its bituminous sands pilot-extraction plant at Bitumont and leases on 5,874 acres of the McMurray oil sands area in northern Alberta.

Premier Manning did not disclose the number of tenders received nor the prices offered by interested companies.

The government announced June 6 that the pilot plant, the 47 acres on which it is located, and the oil-sands leases were to be auctioned. The plant has been idle for the past 5 years.

Dr. S. M. Blair, Toronto oil consultant, reported in 1951 that the oil sands could be economically tapped. Last year private industry moved into the area to begin large-scale exploratory work, and about 12 prospecting leases currently are in effect.

The plant was erected by private interests with government backing. By the time the government took over the plant, about $750,000 had been expended. Since 1948 further government expenditures have raised the total investment to over $1,000,000.

## Big Line Ahead of Schedule

EDMONTON.—Rapid progress in construction of Trans Mountain Oil Pipeline Co.'s big crude-oil trunk line between this oil-producing center and Vancouver, B. C., leads company officials to believe the line may be placed in operation in September.

All told, 575 miles of the 24-in. line was in the ground July 1, and about 300 miles had been hydrostatically tested.

Pumps at the Kamloops and Edmonton stations currently are being tested. They will be used to pump water in tests when the entire line has been completed.

Construction of the tank farm at Burnaby, B. C., and of the deep-sea loading terminal at Westridge is reported proceeding on schedule.

LATIN AMERICA

# Venezuela Reserves Up

## Government figures show a gain for last year in spite of record production; ratio of reserves to production dips

VENEZUELA added to its net crude-oil reserves last year in spite of the fact that 1952 was the biggest year for production in the history of the country, according to the Ministry of Fomento.

Producible reserves at the beginning of this year stood at 9,454,000,000 bbl., according to government figures, an increase of about 409,000,000 bbl. over a year earlier.

The ministry's figures differed from estimates of some economists outside the country. DeGolyer & MacNaughton's Twentieth Century Petroleum Statistics, for example, shows Venezuela's remaining reserves as declining from 10 billion barrels at the end of 1951 to 9.6 billion at the end of 1952, a loss of 400,000,000 bbl. during the year.

According to Venezuelan figures, the amount of oil added to reserves annually has more than replaced the oil produced in Venezuela in each of the past several years, but the ratio of current reserves to production has been declining, as a result of the heavy withdrawal rates of recent years.

**Production at peak . . .** The expansion of the industry in Venezuela since the war years has been phenomenal.

Out of a total production since 1917 of 6,834,237,729 bbl., 40 per cent, or 2,805,000,000 bbl. has been produced in the 5-year period 1948-52. To put it another way, in the last 5 years Venezuela has produced almost 70 per cent as much oil as was produced in the first 31 years of its oil history. Annual production in the earlier period averaged 14,600,000 bbl.; in the postwar period, it has averaged 561,000,000 bbl., or some 320 per cent higher.

In the face of these greatly increased withdrawals, it is natural that the ratio of reserves to production should have declined, from 17.1 in 1949 to 14.3 in 1952. It is considered remarkable that the decline has not been steeper.

While last year was Venezuela's biggest in barrels produced, but it was also among the biggest in terms of new oil found, according to government figures. The result was a drop of only 0.2 in the ratio of reserves to production, as compared with a drop of 1.5 in the previous year (see table on reserves).

The sum of cumulative production of 6,834,327,729 bbl., plus the estimated remaining proven reserves of 9,454,000,000 bbl., gives a total of 16.3 billion barrels as the volume of oil discovered in Venezuela up to January 1, 1953.

Of the total cumulative production, 5.2 billion barrels, or more than three-quarters, has come from western Venezuela, where development first got under way in the early 1920's. These oil fields were still accounting for 70 per cent of the nation's total in 1952.

**1951 discoveries . . .** Reserves figures are closely guarded in Venezuela, since they are the best clue to the value of adjoining unoccupied acreage which may some day be put on the auction block. The government has not granted any concessions since 1943, but this negative attitude seems to be changing.

Figures by companies or by fields are, therefore, completely unobtainable. The appraisal of any given discovery is no cinch, even for the operator, but an outsider can only make a crude guess based on available statistics, and it takes time to accumulate these.

The following data on 1951 discoveries in Venezuela are drawn mainly from a recent publication of the ministry. As Table 1 shows, 934,290,000 bbl. were added to reserves in that year. While this is a net figure and includes increases and deductions for fields discovered in prior years, the bulk may be assumed to be attributable to the new discoveries shown in the table, most of them in the Greater Oficina area of eastern Venezuela.

### Venezuela's Production and Reserves

(In thousands of barrels)

| Year | Additions to reserves | Annual production | Remaining res. at end of year | Ratio reserves to production |
|---|---|---|---|---|
| 1948 | 839,160 | 490,770 | 7,656,390 | 15.6 |
| 1949 | 1,074,150 | 483,210 | 8,247,330 | 17.1 |
| 1950 | 1,034,460 | 547,470 | 8,734,320 | 16.0 |
| 1951 | 934,290 | 623,070 | 9,045,540 | 14.5 |
| 1952 | 1,068,950 | 660,490 | 9,454,000 | 14.3 |

### New Fields Discovered In 1951

| Area or field, state, company, and discovery well— | Date comp. | Type comp. | B. D. IP | Grav. | Deepest perf. | Comp. to 1-1-53 | Prod. to 1-1-53 |
|---|---|---|---|---|---|---|---|
| Boca, Anzoategui, Mene Grande, SG-102 | 4-29 | Dual | 650 | 44.8<br>27.1 | 7,744 | 31 | 4,576,422 |
| E. Caico, Anzoategui, Mene Grande, CaXZ-401 | 9-4 | Dual | 730 | 37.0<br>26.7 | 7,920 | 16 | 1,128,241 |
| E. Soto, Anzoategui, Mene Grande, SXM-201 | 5-25 | Dual | 1,115 | 32.6<br>38.5 | 10,528 | 15 | 1,998,339 |
| Caico Seco, Anzoategui, Mene Grande, CaM-301 | 7-2 | Dual | 580 | 32.1<br>36.4 | 6,409 | 13 | 527,068 |
| Guara, Anzoategui, Mene Grande, GXG-301 | 6-7 | Single | 400 | 33.6 | | 5 | 675,857 |
| Guara, Anzoategui, Mene Grande, GXG-401 | 7-20 | Dual | 300 | 41.1<br>34.2 | 6,602 | 3 | 101,809 |
| Guara, Anzoategui, Mene Grande, GXG-501 | 10-23 | Single | 300 | 19.4 | 5,029 | 1 | |
| Fria, Anzoategui, Mene Grande, FXM-101 | 7-30 | Single | 250 | 34.7 | 4,927 | 1 | 49,063 |
| Chive, Anzoategui, Mene Grande, NXG-501 | 1-14 | Single | 340 | 26.7 | 8,533 | 2 | 298,217 |
| Esquina, Anzoategui, Socony-Vacuum, Esquina-1 | 9-3 | Single | 500 | 44.7 | 4,326 | 3 | 222,889 |
| Apamate, Anzoategui, Mene Grande, TXM-101 | 8-9 | Single | 490 | 40.3 | 6,617 | 2 | 187,137 |
| Chaparro, Anzoategui, Mene Grande, DXG-1 | 5-28 | Single | 170 | 44.3 | 5,213 | 1 | |
| Dakoa, Guarico, Las Mercedes, Dakoa 8-1 | 12-24 | Single | 160 | 41.3 | 3,800 | 4 | 100 |
| Cocomon, Guarico, Ven. Atlantic, Copa-1 | 4-18 | Single | Gas | | 6,682 | 2 | 811 |
| Lechoso, Guarico, Ven. Atlantic, Lechoso-2 | 2-8 | Single | Gas | | 4,711 | 1 | |

*This is not an offer to sell these securities. They are subject to the registration and prospectus requirements of the Federal Securities Act. Information about the issuer, the securities, and the circumstances of the offering is contained in the Prospectus which must be given to the buyer and may be obtained from such of the several Underwriters as are registered dealers in securities in this State.*

July 9, 1953

## 339,733 Shares

# Monterey Oil Company

## Common Stock

**Par Value $1.00 Per Share**

**Business.** The Company is engaged primarily in producing and selling oil and gas from properties in California, Texas and elsewhere, and in exploring for and developing oil and gas in various states. Most of the oil and gas properties now owned by the Company and its subsidiaries were formerly owned by Jergins Oil Company.

**Purpose of Issue.** Of the 339,733 shares offered, 135,000 represent financing by the Company and the proceeds together with other funds will be used to prepay in full the Company's bank indebtedness, and 204,733 shares are outstanding and are being sold by certain stockholders.

**Capitalization.** The outstanding capitalization of the Company consists of $3,333,300 4% notes due to a bank under a term credit agreement and 1,113,695 shares of Common Stock, par value $1.00 per share; 31,955 additional shares are reserved for issuance upon the exercise of outstanding options held by certain officers and employees of the Company.

**Listing.** Application will be made to list the the Common Stock of the Company on the New York Stock Exchange.

## Price $24 per Share

Lehman Brothers

The First Boston Corporation — Goldman, Sachs & Co.

Harriman Ripley & Co. Incorporated — Kidder, Peabody & Co. — Lazard Frères & Co.

Smith, Barney & Co. — Stone & Webster Securities Corporation

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Please send me a copy of the Prospectus relating to the Common Stock of Monterey Oil Company.

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## for 3000 ft. DRILLING - 4000 ft. WORKOVER

**NEW** **TROUBLE-FREE SPOOLING**

Full width calf reel eliminates piling up and cutting in of wire line, a common cause of slowdowns and damage to line. This plus traveling spudding sheaves and heel sheaves assure easy spooling.

**NEW** **VERSATILITY**

4 speeds forward . . . means maximum line speed for any type of job —drilling, cleanout, sandfrac, swabbing, and workover. See table of line speeds, below, and compare!

**NEW** **NOISELESS OPERATION**

Drive to spudding mechanism is noiseless, consisting only of 2 sets of V-belts. "Tor-Shock" (Rubber Torsion) Shock Absorber provides a silent, jar-free drilling motion.

**NEW** **INDEPENDENT DRIVE SYSTEM**

Each drum has independent drive, with disc-type clutch, resulting in less wear on parts, greater efficiency. No pinions to shift; catheads start and stop at will.

**NEW** **SPEED IN SETTING UP**

Tubular telescoping mast is raised quickly by separate mast hoisting drum, provides ample strength without bracing. No mast climbing, no manual operations.

# WALKER-NEER
## Model
# S-43

**4 SPEEDS FORWARD 1 REVERSE**

| | Sand Reel | | Bull Reel | | Calf Reel | |
|---|---|---|---|---|---|---|
| | Lbs. | Ft.PM | Lbs. | Ft.PM | Lbs. | Ft.PM |
| 1st Gear | 18,540 | 210 | 34,740 | 138 | 66,600 | 51 |
| 2nd Gear | 10,300 | 393 | 19,300 | 258 | 37,000 | 110 |
| 3rd Gear | 5,300 | 764 | 9,926 | 502 | 19,000 | 214 |
| High Gear | 3,230 | 1,250 | 6,050 | 820 | 11,650 | 353 |

Above figures are average speeds

# WALKER-NEER

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## Search Stepped Up

### Three tests now drilling in state of Anzoategui

EXPLORATORY activity in the Greater Oficina area of Anzoategui in eastern Venezuela is being stepped up.

Currently three wildcats are under way in the area by Pancoastal Oil Co., C.A., Venezuelan Atlantic Refining Co., and Mene Grande Oil Co.

PCXP-1, which spudded about the end of June, is Pancoastal's first independently drilled well. Up to now, this company has been a nonoperator, all of its production coming from joint operations with Venezuelan Atlantic Refining Co., in which Atlantic has done the drilling and producing. Pancoastal's share of Atlantic's approximately 18,000-bbl.-daily production runs about one-third.

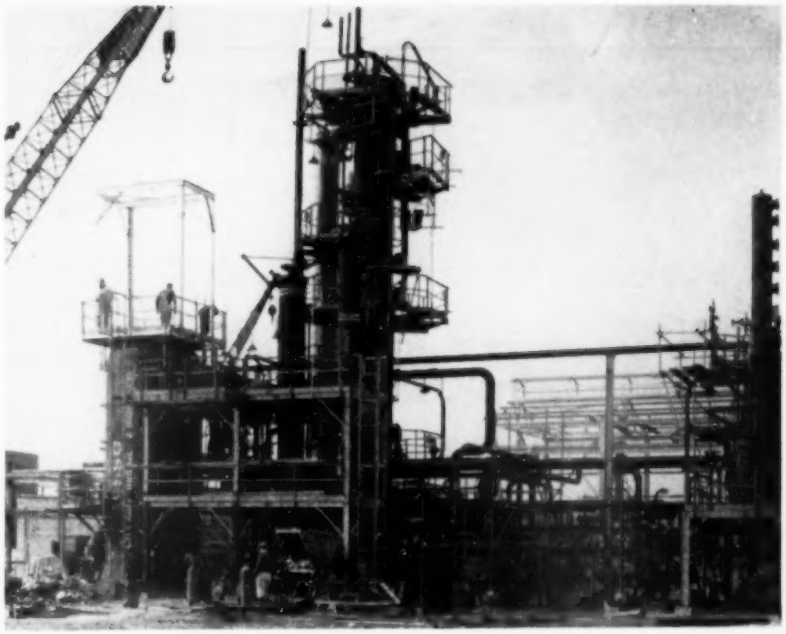
Pancoastal's first bid for independent production is located in the Pelayo concession northeast of Mene Grande's Leona field and northwest of the depleted Pelas-Pelayo wells which Atlantic formerly operated for their joint account. It is several miles from the nearest producing well.

In this same general area but farther to the east in the Las Adjunta concession near the Monagas state line, Venezuelan Atlantic is drilling Junta 2, down about 7,500 ft. at the first of July. Junta 1, 5 miles to the southwest, was completed dry in 1949. If the venture makes a well, it will be Atlantic's first production in Anzoategui since it abandoned Pelas-Pelayo several years ago.

Mene Grande Oil Co., the major operator in Anzoategui, also has a wildcat scheduled for this area. Called Adobe 1, it will be located somewhere between the Pancoastal and Atlantic wildcats.

Mene Grande is currently drilling Nigua 1, the first wildcat in 1½ years to be located in the San Antonio de Guanipa concession, where American Maracaibo (through its Guanipa Oil Corp.) has a 19 per cent overriding royalty. The hole had recovered a fish and was drilling below 11,100 ft. on June 30, with the objective Oficina "U" sands still several hundred feet away. This area, northeast of Oficina field proper, is hot, Socony-Vacuum having recently discovered Oscurote field to the east, Texas Petroleum's Mata field to the north.

Guanipa Oil Corp., American Maracaibo's subsidiary, currently gets about 1,000 bbl. daily as its share of production from the Nipa wells located on the royalty acreage.



### Esso Adding Treating Plant at Fawley Refinery

**This treating plant for desulfurizing tractor fuel is one of several new facilities being built at the Fawley, England, refinery of Esso Petroleum Co., Ltd. The plant cost approximately $1,000,000 and is designed to produce about 7,400 bbl. daily of high-quality vaporizing oil. The Fawley refinery was completed the latter part of 1951 with a capacity of about 120,000 bbl. daily. The second phase of expansion now being carried out includes, besides the tractor-fuels plant, a polymerization unit finished last October, sulfur-recovery facilities due for completion this summer, and a lubricating-oil plant to be completed in September (an Esso photo).**

## Refinery Planned

### New 10,000-bbl. plant to be built in Puerto Rico

A 10,000-BBL. refinery will be built soon near San Juan, Puerto Rico, by Caribbean Refining Co., it was announced last week.

Stockholders in Caribbean Refining are Gulf Oil Corp.; J. H. Whitney & Co., New York investment bankers; Pontiac Refining Co.; Cosden Petroleum Corp.; Ferre Industries, Puerto Rico; Emby Kaye, Tulsa consultant; and Byllesby & Co., New York underwriting firm.

The refinery will process eastern Venezuela crude oil and will market most of its products in the San Juan area. Universal Oil Products Co. is designing process units, and the refinery will be built by Fluor Corp. Construction is scheduled for completion between January and March of 1955.

Caribbean Refining was organized tentatively more than 2 years ago, but progress in planning the project was delayed by negotiations for a long-term sales contract covering the bulk of the proposed refinery's fuel oil, which will be a principal product.

**Planned facilities . . .** The refinery will include crude distillation and vacuum flashing, catalytic cracking, gas-concentration and vapor-recovery units, catalytic polymerization, a liquefied petroleum gas unit, and various treating facilities. Electric desalting equipment will be installed to treat crude oil before processing.

Crude oil will arrive by tanker and be delivered to the refinery site by a 2-mile pipe line. The refinery location is near Bayamon about 2¼ miles southwest of the new docks serving the island and is around the bay from San Juan.

Products will move almost entirely by pipe line and tank truck. Plans call for delivery of the bulk of the fuel oil to the consumer "hot" by an insulated pipe line. All normal refinery products will be made in the refinery, but the major portion will be gasoline and fuel oil. Backers of the project point out that the climate in Puerto Rico eliminates a market for domestic fuel oil and, at the same time, makes for a relatively uniform motor-fuel consumption the year round.

Edwin Singer, president of Pontiac Refining, is president of Caribbean Refining and is in charge of the refinery-construction program.

## Aramco Sets Drilling Record in Shedgum Area

**This is one of the three rigs being used by Arabian American Oil Co. to develop the Shedgum area, an important northeasterly extension of Ghawar field in Saudi Arabia. Another Shedgum well, No. 8, recently set a 42-day drilling record for the area. The reduction in drilling time in this 7,226-ft. well was due to: (1) improved cementing techniques; (2) better bit selection due to accumulated information and the use through a large part of the hole of recently introduced jet bits; (3) improved mud programs, especially in lost-circulation zones; (4) maintenance of an ample water supply, not often available; and (5) concentrated and well-organized supervision of drilling personnel (an Aramco photo).**

# Aden Work Pushed

### Erection of huge plant's first process unit begun

ERECTION of the first process unit is under way at the new 100,000-bbl.-daily refinery of Anglo-Iranian Oil Co., Ltd., at Aden.

Units of the sulfur dioxide extraction plant for the manufacture of premium-grade kerosine are now in position on the site. Foundation work is being pushed on other process facilities, including the two crude-oil distillation units. Initial processing operations are scheduled to begin about the end of 1954.

So far more than 65,000 tons of materials have been shipped to the refinery site—about 85 per cent of them from the United Kingdom.

Construction of the big plant, the largest new refinery job now under way, and of the required oil port will cost the equivalent of about $150,000,000. Construction contracts for the refinery are held by Middle East Bechtel Corp. and the British firm, George Wimpey & Co. The latter firm also is building the port. By first of this month, more than 1,000,000 cu. yd. of sand had been dredged to provide an approach channel and turning circle to accommodate tankers. By the time the port is completed more than 5,700,000 cu. yd. will have been dredged.

The refinery and tank farms will occupy 270 acres of the peninsula on which Aden is located. Aden town is about 10 miles to the east.

Refinery facilities will include two atmospheric distillation units complete with stabilizers and caustic treaters, one platforming unit, and the sulfur-dioxide unit. The power station will generate 30,000 kw., and the installed capacity of the boiler battery will be 600,000 lb./hr.

**Drive for capacity . . .** Construction of the Aden plant and of a new 60,000-bbl.-daily refinery at Kwinana, near Fremantle in western Australia, represents a major effort by Anglo-Iranian to replace the 500,000 bbl. daily of refinery capacity at Abadan lost to the company through the Irainian nationalization.

The company said recently that more than 22,000 tons of materials so far have been shipped to the Kwinana site. Orders for about $20,000,000 in equipment and materials for this refinery have been placed with British, American, and Australian firms—about $10,000,000 in Britain and $6,000,000 in Australia.

Technicians working on the refinery site have occupied the first permanent houses completed in Medina, one of four residential quarters to be built near the plant. More than 330 of the 1,000 houses which the western Australian government agreed to build for refinery workers will be completed by September.

## Crude Price Increased

Anglo-Iranian Oil Co., Ltd., last week boosted the price of Middle East crude oil 25 cents a barrel, following by about a week a similar hike by Gulf Exploration Co. for Kuwait crude oil.

Anglo-Iranian's increase was effective July 16. It brought 31° to 31.9 - gravity Kuwait oil to $1.75 a barrel at Mina-al-Ahmadi and 36° to 36.9° Iraq crude to $2 a barrel at Fao (Persian Gulf) or $2.54 a barrel at Tripoli, Syria.

# Suez Shipments Up

### Tankers comprised 60 per cent of all 1952 traffic

TANKER shipments through the Suez Canal rose to a total of 60.2 per cent of all traffic through this important waterway in 1952.

The first full year of shutdown operations in Iran produced significant changes in the pattern of canal traffic. According to the report of the Suez Canal Co., the south-bound traffic of loaded tankers rose sharply from 60,000 tons during the first half of 1951 to 3,792,000 tons for the whole of 1952.

In both directions the canal recorded a total of 12,168 transits and a net aggregate of 86,137,000 tons during the year, a rise of 7.2 per cent over the previous year. Two-thirds of the overall improvement was accounted for by the heavier south-bound traffic which was due almost wholly to oil shipments.

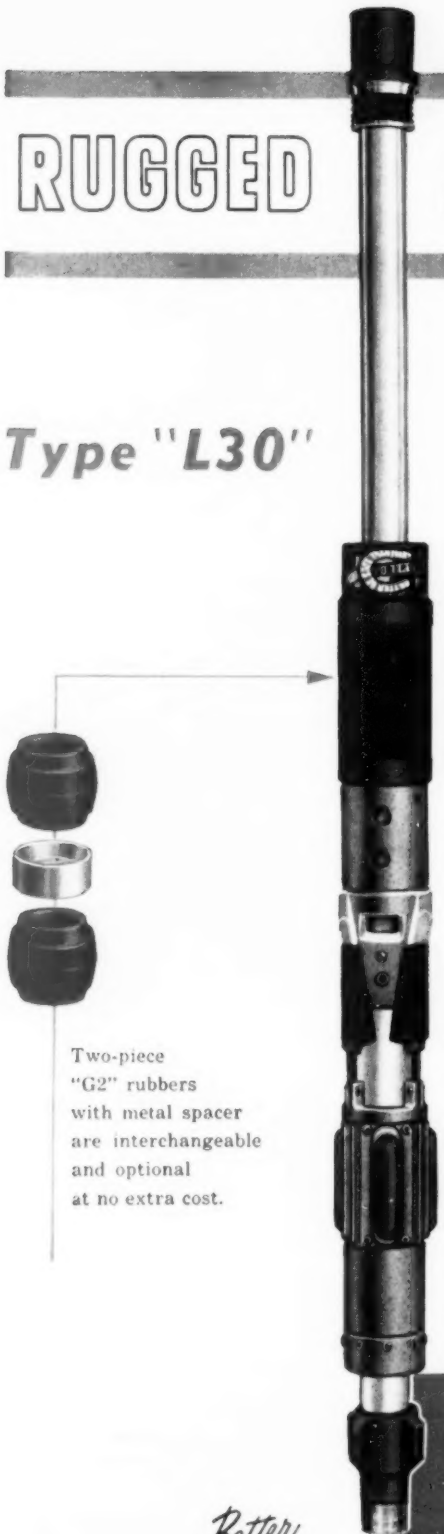
**New record . . .** North-bound cargo traffic reached a new record of 61,447,000 tons, up 3.6 per cent over 1951. The gain was due entirely to oil shipments which reached a total of 45,933,000 tons, 7 per cent higher. Of the total of oil shipments, crude petroleum accounted for 96 per cent against 84 per cent in 1951. Kuwait originated 73 per cent of the oil shipments, and Iraq emerged among the countries exporting oil via the Suez Canal due to the beginning of commercial operations from Zubair field in southern Iraq.

Among the countries of destination for oil shipped through the canal, Britain led with 34 per cent of the total.

# RUGGED AND RELIABLE

## GUIBERSON'S
## *Deep Well Packer*

### *Type "L30"*



Two-piece "G2" rubbers with metal spacer are interchangeable and optional at no extra cost.

For deep well work with high temperatures and pressures, use Guiberson's dependable "L30" Packer. It will give you long valve travel (30 inches) with minimum overall length at no extra cost. You can pull the "L30" surely and safely. The fast-action automatic latch, protected by a positive anti-lock device that assures ready release, snaps easily into latched position. Tough, long-wearing friction pads supply ample drag. Packing rubbers of advanced design will not vulcanize to the casing wall. All these features and others too are available on the "L30" in a wide range of casing sizes.

For circulating *above* the packer, Type "L30P" with perforated mandrel is available. Packers with longer or shorter valve travel may also be had on special order.

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Sold By Leading Oil Field Supply Stores Everywhere

***Another new development using***

# B. F. Goodrich Chemical *raw materials*

*Kimray Floatless Liquid Level Controller made by Kimray, Inc., Oklahoma City, Okla. Diaphragm molded by Murray Rubber Company, Houston, Texas. B. F. Goodrich Chemical Company supplies the Hycar rubber only.*

## Floatless device splits gas and oil . . . *with Hycar's help*

EARLY types of oil and gas separators used float controls that frequently were real headaches for production men. Trouble often happened in the stuffing box. The packing was usually too tight or too loose, requiring constant attention and supervision.

But when floatless controls came along, that trouble just disappeared. You can see a floatless control pictured here, dismantled to show its "heart"—a Hycar rubber diaphragm.

Because it is constantly exposed to the deteriorating effects of oil and gas, the Hycar diaphragm must be extremely resistant to them. And it *is*, because one of Hycar's important properties is its resistance to petroleum products.

Important, too, is Hycar's resiliency and strength, because this diaphragm may flex as often as 2,000 times per day!

Hycar has other advantages—resistance to abrasive fluids, heat and cold, many chemicals. Perhaps a Hycar rubber compound can help you solve a problem, or improve a product to bring in more sales. For helpful technical information, please write Dept. HJ-8, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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**GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors**

France accounted for 27 per cent. The United States took 8 per cent.

Toward the end of 1952, a falling off was noticed in Suez shipments of crude oil from Saudi Arabia and Kuwait. This was attributed to the opening of the Kirkuk-Banias pipe line in April of 1952. Another contributing factor was the withdrawal of MSA credits for the purchase of oil in the Middle East.

### New Oil Pools Discovered

Discovery of several new oil deposits at undisclosed locations in Turkey has been announced by the Turkish Institute for Mineral Research.

In a broadcast over Ankara radio, the institute said locations for new wells have been made and some of the equipment in the Raman oil area is being set up at the new sites. The institute said that each of the new wells is expected to produce from 300 to 500 bbl. of oil daily.

At Raman, three new wells have been completed producing from 500 to 630 bbl. of oil daily. Producing wells in the Raman area now total 14.

The institute said that two new producers have been brought in in the Yarzan area for about 470 bbl. daily each. This field now has seven wells.

Another new well is scheduled to be put down at Adana.

### Plant Materials Assembled

All material for the Turkish Government's new refinery at Batman, near Ramandag, has arrived in Iskanderun and is being transported to the refinery site.

The new plant tentatively is scheduled to go into operation about the middle of next year *(The Oil and Gas Journal, July 14, 1952, page 84)*. It will have a capacity of about 270,000 tons annually, or about 5,400 bbl. daily.

Production will include 35,000 tons a year of gasoline, 29,000 tons of gas oil, 10,000 tons of diesel oil, 37,500 tons of asphalt, and 130,000 tons of fuel oil.

### Finland May Build Refinery

The Finnish Government has an investigation under way to determine whether construction of a refinery in the country would be economically feasible.

Tentative plans call for a plant which would process 450,000 tons annually, or about 9,000 bbl. daily.

The plant would be operated by Nests Co., Ltd., a state enterprise which currently stores oil.

Location for the plant has not yet been selected.

### Anglo-Iranian's Newest Cat

**Newest of the three 10,000-bbl. daily fluid catalytic cracking units installed in refineries of Anglo-Iranian Oil Co., Ltd., in the United Kingdom is that at the company's Kent refinery on the Thames Estuary. This unit is scheduled to be commissioned the second half of this year. Similar equipment is already in service at A.I.O.C. refineries at Llandarcy in Wales and at Grangemouth in Scotland.**

## AFRICA

# Oil Search Vital

## A.E.O. warns production in Egypt due to decline

ANOTHER warning that crude-oil production in Egypt cannot be much longer maintained in the absence of exploratory work has been given by Anglo-Egyptian Oilfields, Ltd.

A.E.O., in its recent annual report, said that it is urgently necessary for exploration to be resumed if there is to be any hope of replacing present reserves by new discoveries and offsetting the normal exhaustion inherent in all oil fields.

The company, a member of the Royal Dutch-Shell Group, said that despite difficulties with water entering productive wells, Egyptian output last year showed a small increase of 100,000 bbl. to reach a total of 16,500,000 bbl. (about 45,000 bbl. daily). However, technical studies of the limestone formations of the Sinai fields show that the producing rate is bound to drop soon.

**A step forward . . .** New exploration in Egypt has been at a stand still because of the unfavorable terms in the 1948 Mining Law and other legal obstacles. A. E. O. said that the Egyptian Government took a step forward last February when it brought into force a new law governing oil exploration and development.

In July 1952, the Egyptian Government invalidated on procedural grounds the agreement that had been reached the previous year between the government and the companies on oil pricing. This 1951 agreement not only involved the acceptance by the indigenous industry of heavy concessions regarding the past, A.E.O. said, but also in fixing the basic price of domestic oil at a level substantially below the landed cost of imported crude.

In addition to the price question, two other major matters are still outstanding. The Ras Matarma lease for which the company applied in 1948 after discovering a small amount of production in three out of the six wells drilled has not yet been granted despite repeated representations by the company. Moreover, A.E.O. was informed last February that the applications for prospecting licenses which it had filed with the government after spending substantial sums in selecting the areas were deemed by the government to be invalid and that the company had lost its right of priority in these specific areas.

## SOUTH PACIFIC

### Liquid-Fuels Plant Planned

A plan to produce liquid hydrocarbons from coal at Ohai on New Zealand's South Island has been advanced by a local company.

The company, Southern Oil, Ltd., known as Sol Development, is asking government approval for a large-scale project. It has taken options and rights over the coal deposits and sent a director on a tour of investigation to the United States, Britain, and Germany.

An announcement by the company in Wellington said the estimated output of the plant would be 5,000 bbl. daily, or about one-third of the dominion's consumption. The company pointed out the operation would provide employment for about 1,000 workers and said it would save dollars now spent for oil imports. The coal deposits at Ohai were estimated to contain 150,000,000 to 200,000,000 tons.

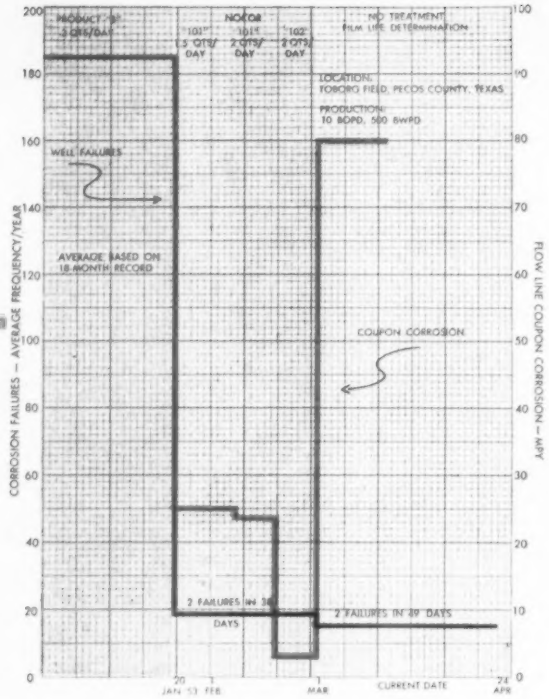
Largest coal-to-oil plant now under construction is the Sasol project in South Africa for which Kellogg is the contractor. This is a government-backed undertaking which will use low-cost coal deposits. The plant is expected to go into operation next year.

TABLE I— A MAJOR COMPANY'S CORROSION COST FOR 41 WELLS IN THE McELROY FIELD, GRAYBURG FORMATION, IN WEST TEXAS, MONTH OF AUGUST 1951. COMPETITIVE INHIBITOR WAS USED.

| | |
|---|---|
| COST OF INHIBITOR USED | $ 97.54 |
| COST OF UNIT TIME REQUIRED | 2,440.41 |
| COST OF EQUIPMENT REPLACED | 2,067.35 |
| AVERAGE COST PER WELL | $ 112.32 |

TABLE II— CORROSION COSTS OVER A 3-MONTH PERIOD IN 1953 ON THE 17 MOST HIGHLY-CORROSIVE OF THE ABOVE 41 WELLS. INHIBITOR USED WAS CARDINAL CHEMICAL'S "NOCOR". AVERAGE COSTS ON NORMALLY CORROSIVE WELLS WOULD BE STILL LOWER.

| | MARCH | APRIL | MAY |
|---|---|---|---|
| Cost of Nocor Inhibitor | 98.31 | 88.14 | 93.00 |
| Cost of unit time required | 00.00 | 00.00 | 00.00 |
| Cost of equipment replaced | 00.00 | 00.00 | 00.00 |
| | 98.31 | 88.14 | 93.00 |
| Average cost per well | 5.78 | 5.18 | 5.47 |




# Engineering Better Corrosion Controls

## CONTROLLED PROGRAM OF COMBATING CORROSION USING NOCOR. AN INHIBITOR DEVELOPED THROUGH EXTENSIVE RESEARCH AND FIELD TESTING.

Many producing formations of the Permian Basin are among the most highly corrosive in the world. The billions invested in this region are often guarded by an infinitesimally thin film of inhibitive chemicals —some good, others better.

It was only natural that Cardinal Chemical, Inc., should locate its corrosion research laboratories at Odessa, center of this prolific oil-producing basin.

Table 1 shows how, in August of 1951, one major company's corrosion costs reached an all-time average high of $112.32 per well. In September of 1951 the company pulled all wells to run bottom hole pressure tests. At the same time, corroded equipment was replaced that appeared in danger of immediate failure. Corrosion cost figures for September are not shown because these figures would reflect costs of some equipment that had not yet actually failed.

A planned program of corrosion inhibition was inaugurated in October of 1951 to excellent effect.

In March of this year, with the use of the Cardinal inhibitor "NOCOR" corrosion costs dropped to an all-time low plus an added saving in per-gallon cost of inhibitor. Average costs in Table 2 are based on the company's 17 most corrosive wells and reflect a higher cost per well than would a field-wide average.

In another instance, as illustrated in the graph, where the operator turned to NOCOR, failures dropped from 279 in a period of 78 weeks to a new low of 4 in 12 weeks. Failures continued to drop even though NOCOR treatment was discontinued. The 49-day check period without treatment illustrates NOCOR's residual protection. The four failures in three months charged against NOCOR were failures of equipment in use during the 18 months prior to March while wells were treated by a competitive inhibitor.

The secret of NOCOR's success lies in its unique characteristics. NOCOR combines chemically with steel itself. The NOCOR molecule adsorbs normal to surface, erecting a close-packed diffusion barrier. NOCOR's long-life film requires little repair, and oil-wetting additives increase its efficiency still further. Structurally non-ionic, it cannot raise pH of brine. NOCOR is non-irritating and non-toxic, contains no constituents such as arsenic which poison catalysts used in refining processes.

These are only two of the countless instances in which NOCOR proved itself and do not indicate its effectiveness only in wells of a particular field or formation. Case histories in fields thousands of miles apart prove NOCOR's superiority wherever corrosion is encountered. For instance, treatment of 150 wells near Great Bend, Kansas, was begun on February 10, 1953, following treatment with a competitive water-dispersible product. Corrosion maintenance costs have decreased to an all-time low following the change-over to NOCOR "102".

Both NOCOR "101" and its successor NOCOR "102" are the result of Cardinal's "unending research to make good products even better." In the laboratory and in the field, Cardinal Chemical is engineering better corrosion control, guarding the billions invested underground in all corners of the world.

For the Complete story, write today for this free 12-page booklet.

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INCORPORATED
HOME OFFICE
P. O. BOX 2049, ODESSA, TEXAS

Advertisement

# PERSONALS

## New Seaboard Head

### McFarland to presidency after 22 years with firm

RUSSELL S. McFARLAND, 59, the newly elected president of Seaboard Oil Co. of Delaware, has directed the company's growth in the Mid-Continent area since 1932.

It was in that year that, as a vice president, he was sent to Dallas to open an office for Seaboard. He has remained there since then.

Although a native of Denver, he received a degree in petroleum geology from the University of Missouri, where he also did graduate work. For 15 years he was associated with Empire Gas & Fuel Co., Twin States Oil Co. (Sun Oil Co.), and Sunray Oil Corp.

In 1931 he was placed in charge of some wildcat operations for Seaboard in Canada. He became a company director in 1945 and last year was made executive vice president in charge of operations in the United States and Canada.

In spite of his busy schedule McFarland finds time to write articles for technical magazines and trade journals, and to take an active part in professional organizations. He has served as vice president and president of the American Association of Petroleum Geologists.

He was presented the Distinguished Service Award from the Mid-Continent Oil and Gas Association in 1949. He also is a director of the Independent Petroleum Association of America and a member of the American Institute of Mining and Metallurgical Engineers and the American Petroleum Institute.

In Dallas he serves as a director of the Chamber of Commerce and Dallas Country Club, and is a member of the Petroleum Club, Athletic Club, and Engineers Club.

**A. W. G. Trantor** has been appointed general manager of the Aden refinery of Anglo-Iranian Oil Co., Ltd. He previously was works manager at Anglo-Iranian's new Kent refinery on the Isle of Grain, England. **A. Patrickson,** process superintendent at the Kent refinery since January 1952, has succeeded Trantor as works manager at Kent.

**L. S. Collins,** a director of Carter Oil Co. since 1940, has been elected a vice president. He began his oil career with Carter in 1916.

**T. B. Doherty,** assistant superintendent in the Edmonton, Alta., refinery of Imperial Oil, Ltd., has been transferred to Toronto, Ont., as management assistant in the manufacturing department.

**Lyle R. Sheppard,** Shell Pipe Line Corp., Houston, has been named chairman of technical practices subcommittee No. 14-A on electrical holiday inspection of coatings by the National Association of Corrosion Engineers.

**H. W. Brown,** chief geophysicist for Carter Oil Co., has been named manager of exploration, effective September 1. He began his career with Humble Oil & Refining Co. in 1928 before joining Carter as a geophysical party chief. Later he became district supervisor in the exploration department and supervisor of foreign operations. In his new post he will direct Carter's search for new crude-oil reserves in 26 states.

**Wayne Z. Burkhead,** Union Oil Co. of California, has been elected president of the Houston Geological Society for 1953-54. Other officers named include: **Tom D. Hedley,** British-American Oil Producing Co., first vice president; **David B. Remick,** Pan American Production Co., second vice president; and **John L. P. Campbell,** Lane-Wells Co., secretary. Members of the advisory committee include: **Hillord Hinson,** consultant; **Richard M. Holland,** J. S. Abercrombie Oil Co.; and **Ed J. Smith, Jr.,** Standard Oil Co. of Texas. **Ray C. Lewis** is past president.

**Keith Doig,** mechanical engineer for Shell Oil Co., has been transferred from the Los Angeles office to New Orleans. Other recent transfers in the West Coast production engineering department include: **W. K. Godfrey,** from Los Angeles to Ventura, Calif.; and **A. C. Cowan,** from Glendive, Mont., to Casper, Wyo. **S. M. Paine** has been transferred from Casper to Houston.

**William F. Kirk,** San Marino, Calif., assistant manager of the economics department of General Petroleum Corp., has been appointed assistant director of the program division of the Petroleum Administration for Defense. His appointment is effective August 14. He has been with General Petroleum since 1929.

**Wells W. Rood,** Chanute, Kans., has joined the staff of the Kansas State Geological Survey at the University of Kansas. He formerly was an oil operator in eastern Kansas.

**H. W. McCormick** has been appointed district superintendent of the Vernal, Utah, district for Carter Oil Co. He replaces **C. L. Cooksey,** who has been transferred to the exploration department in Denver. Other company changes involve: **R. E. Hammond,** production department staff assistant in the eastern division; **J. S. Bottler,** division engineer in the eastern division, replacing Hammond; **H. C. Kauffman,** division engineer in the western division, replacing **R. S. Frazier; H. B. Bullard,** district engineer in Magnolia, Ark., replacing Kauffman; and **B. M. Bradley,** assistant district superintendent in St. Elmo, Ill., replacing McCormick.

**E. E. Moody** has been named in charge of all materials inspectors in Standard Oil Development Co.'s Esso engineering department. Other new group heads include: **T. C. Hahn,** in charge of expediting in Elizabeth, N. J.; **R. C. Schade,** in charge of the division's office in Antwerp, Belgium; and **J. V. Stuck,** head of the division's Pittsburgh office.

**Claude E. Leach** has been appointed manager of the geological department in the Mid-Continent division of Tide Water Associated Oil Co. His head-

# PERSONALS

## Maintenance Practices Studied

**These scientists are shown examining types of corrosion and plastic safety shields used to cover acid valves during a recent visit at the engineering laboratory of Standard Oil Development Co. They were part of a 27-man group from western Europe which came to this country to study preventive-maintenance practices developed by chemical and petroleum industries. The tour was sponsored by the Mutual Security Agency and the Organization for European Economic Cooperation. Left to right, they are: Ernest A. Blackwell, chief of the complete protection department, Bureau de Representations J. Trachet, Brussels; Mario Jacopetti, professor of electrochemistry, University of Naples, Italy; Guiseppe Basilisco, chief of technical services, Aquila refinery, Trieste; Henri G. Moreau, chief engineer, materials control, Cie. de Raffinage Shell Berre, France; Jean M. Barbier, engineer-in-charge, research and development department, Engineering Institut Francaise du Petrole, Paris; Jean Tourett, engineer, corrosion department, Cie. Francaise de Raffinage, Paris; John E. Bach, Mutual Security Agency project engineer; Enrico Donati, head of the central laboratory, Dalmine S.p.A., Bergamo, Italy; and Dr. Erich Rabald, lecturer, Karlsruhe Institute of Technology, and editor of "Werkstoffe & Korrosion" of the Federal Republic of Germany.**

quarters will be in Houston. For the past 4 years he has been assistant manager of Tide Water's operations in Saskatchewan.

**Robert G. Celum,** formerly a technical assistant for Standard Oil Co. of California in Kettleman Hills, Calif., has been named a natural-gasoline operations technical assistant for Richfield Oil Corp. in Cuyama, Calif.

F. L. HARTLEY

**Fred L. Hartley,** general superintendent of operations for Union Oil Co. of California, was installed as president of the California Natural Gasoline Association during the annual meeting of the association's board of directors July 14. **A. C. Lyles,** chief gas engineer, General Petroleum Corp., was elected vice president, and **E. R. Millett, Jr.,** was reappointed secretary-treasurer.

**Dr. Gustav Egloff,** Universal Oil Products Co., has been appointed a member of the Washington Award Commission of the Western Society of Engineers for 1953-56. He also has been named a national director of the Armed Forces Chemical Association and a member of the advisory committee, Midwest chapter, of the Armed Forces Chemical Association, for 1953-54.

**W. A. Scott,** exploitation engineer for Shell Oil Co., has been transferred from Hobbs, N. M., to the technical-services division in Houston.

**C. L. Larson, Jr.,** Rocky Mountain division manager for Stanolind Oil & Gas Co. in Casper, Wyo., has been elected a member of the board of directors.

**L. L. Richardson,** until recently a field operator for Union Oil Co. in Santa Maria, Calif., has been advanced to assistant production foreman and transferred to the Coalinga district.

**William B. Agocs,** formerly head of the department of geophysics of the University of Tulsa, has joined the staff of Aero Service Corp., Philadelphia world-wide aerial mapping and exploration organization.

**James H. Curtis** has been appointed assistant to the president of the Lummus Co., New York engineers and constructors. He formerly was general manager of manufacturing for General Petroleum Corp., Los Angeles.

**J. A. Serey, Jr.,** Southwest Exploration Co., Huntington Beach, has been elected president of the Southern California Meter Association. Other new officers are **G. C. Wilson,** Southern California Gas Co., vice president; **G. H. Forster, Jr.,** The Texas Co., secretary-treasurer; and **P. Ver Planck, Jr.,** Southern California Gas Co., auditor.

**G. G. Gallagher** of Fluor Corporation, Ltd., was chosen program chairman for the coming year.

**W. G. D. McElrath,** formerly with El Paso Natural Gas Co. in Blythe, Calif., has joined Utah Natural Gas Co. as superintendent in Provo, Utah.

**Herbert G. Officer** has joined North American Royalties, Inc., as geologist and engineer. Officer, who has been with Gulf Oil Corp. the past 7 years, recently served in Bismarck, N. D., as manager of Gulf's exploratory activity in North and South Dakota.

**Leland E. Wilson,** drilling engineer for Atlantic Refining Co., has been transferred from Midland, Tex., to Lafayette, La.

**Elihu Madison,** manager of the economics department of The Texas Co., will join the Petroleum Administration for Defense August 1 as deputy director of the program division and on August 16 becomes director of the division. **James S. Weathersby,** senior research economist for Atlantic Refining Co., has been appointed chief of the domestic petroleum branch of the program division. Weathersby succeeds **Joseph Hall,** who has returned to his position with Phillips Petroleum Co.

# PERSONALS

**Floyd Acklin, Jr.,** geologist for Richardson & Bass, has been transferred from Carlsbad, N. M., to Fort Worth.

R. V. HUGHES

**Dr. Richard V. Hughes** has been appointed technical assistant to the vice president of Gulf Oil Corp.'s Houston division, succeeding **Paul Weaver,** recently retired. Dr. Hughes joined Gulf in 1953, and formerly was at Stanford University as professor and head of the department of petroleum engineering. During World War II Dr. Hughes served as chief of the development unit, production division, Petroleum Administration for War. From 1944-49 he was director of production research for the Pennsylvania Grade Crude Oil Association.

**George P. Walker, Jr.,** district geologist for Continental Oil Co.'s southern region, has been promoted to division geologist with headquarters at Houston, succeeding **M. B. Morris,** who resigned to join Lion Oil Co. as geologist in Corpus Christi. **Phillip J. Lane,** Corpus Christi geologist for Continental, has been promoted to district geologist with headquarters at Lafayette, succeeding Walker.

**C. F. Stephenson,** superintendent of Magnolia Petroleum Co.'s Pegasus producing district in West Texas, has been promoted to assistant division superintendent of the Oklahoma division in Oklahoma City. Other company changes include: **Kenneth R. Joynt,** transferred from the Vanderbilt producing district to the Pegasus district as district superintendent; **John S. Russell,** promoted from assistant superintendent of the Chase, Kans., district with headquarters in Kimball, Neb., to district superintendent in the Vanderbilt district; **Clarence E. Taylor,** superintendent of the Alice, Tex., producing district, transferred to Drumright, Okla., as superintendent of the Cushing district; **J. R. Posey,** superintendent of the Cushing district, transferred to the Alice district as district superintendent; **John C. Fry** and **Aubrey B. Cannon,** promoted from driller to drilling-tools foreman in the Gulf Coast drilling-tools district; **William A. Sherman,** promoted from marine drilling-tools foreman to marine drilling-tools supervisor in the Louisiana-Gulf district; **Forrest B. Farmer,** promoted from assistant production foreman to foreman in the Brownfield producing district; and **Earl D. Hughes,** promoted from pulling-unit operator to assistant foreman in the Brownfield district.

**N. J. Lea,** seismologist in the Tulsa offices of The Texas Co. for the past year and a half, has been transferred to the Houston geophysical division as supervisor of field operations.

**F. C. Culbertson, Jr.,** senior petroleum engineer for Humble Oil & Refining Co. in the Thompsons district, Gulf Coast division, has been transferred to the Imogene district in the Southwest Texas division. **Robert Grey Hindman,** civil engineer, has been transferred from the Gulf Coast division office to the California area office. Other transfers involve: **R. H. Suman,** petroleum engineer, from the Stratton district, Southwest Texas division, to the Thompsons district, and **J. C. Taylor, Jr.,** associate petroleum engineer, from Houston to the Hobbs district in the West Texas division, as petroleum engineer.

**Reuben F. Pfennig** has been promoted to research specialist for Humble Oil & Refining Co. at Baytown, Tex. Now serving in the research and development division, Pfennig joined Humble in 1936. He will specialize in development and evaluation of processes for manufacture of petrochemicals in his new position.

**J. C. Lusk,** geophysicist for Sinclair Oil & Gas Co., has been transferred from Laverne, Okla., to Midland, Tex.

**A. J. Lewison,** formerly an independent operator, has been appointed a geologist for Ewing Oil Co. in Ewing, Va.

**Todd C. Storer,** petroleum engineer for Stanolind Oil & Gas Co. in Corpus Christi, has been promoted to senior petroleum engineer in Houston.

**William Caplan,** Fort Worth, has been appointed staff geologist for the geology division of the Arkansas Resources and Development Commission in Little Rock.

**S. B. Irelan,** president of Cities Service Oil Co., Bartlesville, Okla., has been elected president of the Bartlesville Chamber of Commerce.

**C. T. Chenery,** New York, board chairman, has been named president of Southern Production Co., Inc., Fort Worth. He succeeds **H. Gordon Calder,** who resigned recently.

**Robert W. Garwick,** Gulf Coast district geologist for General Crude Oil Co. in Houston, has resigned to open offices in Houston as a consulting geologist. Before moving to Houston, where he served with General Crude Oil for 5½ years, Garwick was with Sinclair Refining Co. in various exploration projects in Ethiopia.

# DEATHS

**Owen Fuller Thornton,** 36, vice president of the Louisiana Land & Exploration Co., died at his home in New Orleans July 15. He held various positions with Tide Water Associated Oil Co. and The Texas Co. before joining Louisiana Land in March 1951.

**William H. Horner,** 83, retired independent oil operator, died July 13 at his home in Cleveland, Okla. He worked for the old Test Oil Co. prior to becoming an independent operator.

**William R. Bingham,** 69, construction engineer for Wilcox Oil Co., died July 13 in Tulsa.

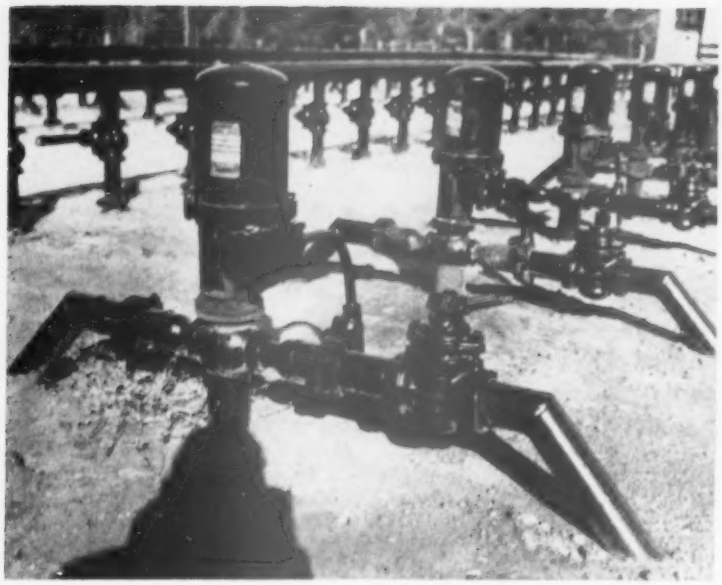
**Verlyn W. Wallace,** 55, driller, died recently in Tulare, Calif.

**Clyde C. Callan,** 76, drilling contractor for Wilcox Oil & Gas Co., died July 11 in a Tulsa hospital. He was a native of Ohio, and came to Tulsa in 1910.

**James G. Sloan,** 71, Monahans, Tex., died July 10 in a Tulsa hospital. He formerly was a rig builder in Byrum Center, Pa., and a drilling contractor in Tulsa.

**Early Clinton Eastman,** chemical engineer for Standard Oil Development Co. for 27 years, died July 12 in Plainfield, N. J.

**Oddie R. Cooper,** 58, a partner in Cooper-Herring Drilling Co., Tyler, Tex., died July 8 in Tyler.



1. These flowing wells automatically controlled by electric motor valves.

2. Solenoid diaphragm valve, flowing well.

## Starting and Stopping Flowing Wells . . .

**Photos 1-4.** In East Texas, where operators are concerned with proration, economical use is made of time-clock-controlled valve-operating mechanisms.[1] These valves are of two general types. Fig. 1 shows the electric-motor-operated (an electrically operated hydraulic pump which actuates a piston on the control cylinder to open or close the valve). Fig. 2 illustrates the diaphragm operated (a solenoid-actuated pilot valve which controls well head pressure behind diaphragm to open or close valve).

H. Pistole and B. Sullivan[1] mention that a flowing well can be provided

# 25 Ways to Automatically Gage and

**by Robert L. Beckwith***

## Will It Pay You

### . . . to make these production duties automatic?

UNDER present-day methods of operation, production men have many duties to perform. In some cases these duties have been segregated and specialists set up to handle specific jobs. However, rather than become involved in organizational setups, consider them all under the general classification of "production men." Some of their important duties include:

1. Start and stop the production from wells.

2. Measure the quantities of oil, gas, and water from each individual well (at some predetermined schedule), and also from all wells on particular property.

3. Prepare the oil for delivery or sale by breaking emulsion and removing water and sediments.

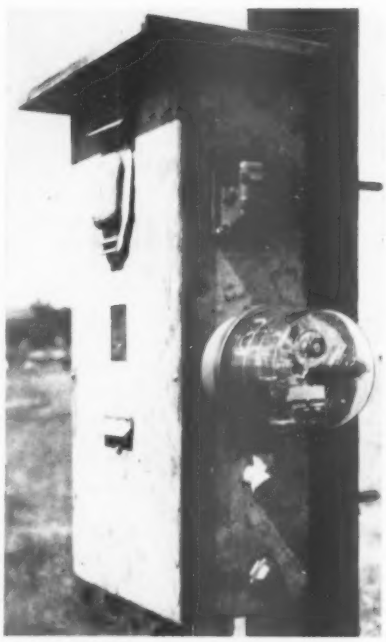
4. Be ready to shut in a well or wells wherever equipment fails.

5. Maintain the wells and producing equipment.

6. Maintain records of individual production rates, total production rates, oil and gas delivered or sold, maintenance of wells and equipment.

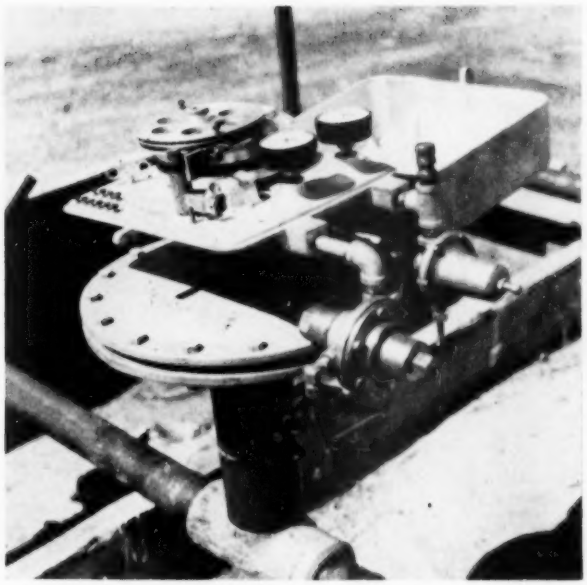
Any one of these various duties can take up a lot of time and manpower. Some of them are routine manual operations, while others require experience and man's ability to think out a solution. We cannot do much about the latter; but with man's ingenuity in developing ways to increase his productivity, we can do much with the former.

*Engineer production, Standard Oil Co. of California, San Francisco.



5. Control panel and time clock switch, for part-time pumping.

3. Gas lift well controlled by intermittent time-clock valve.



4. Time clock control equipment, intermittent gas-lift service.

with electric control equipment, exclusive of electric distribution system, for $225, as compared to $400 for pneumatic equipment. This cost differential is not comparable when considering well pressures in excess of 1,200 psi. because only pneumatic-actuated valves are available beyond this working pressure.

In California extensive use is being made of these same time-clock-controlled diaphragm-actuated valves for intermittent gas-lift operations. A typical installation is shown in Fig. 3. The time clock itself and other moving parts are exposed in Fig. 4. Although only three types of valves are shown, there are other valves available which can be similarly automatically time or remote controlled to open up or shut in the flow from a well.

# Control Oil-Field Producing Operations

6. Motor-driven pumping unit on part-time schedule.

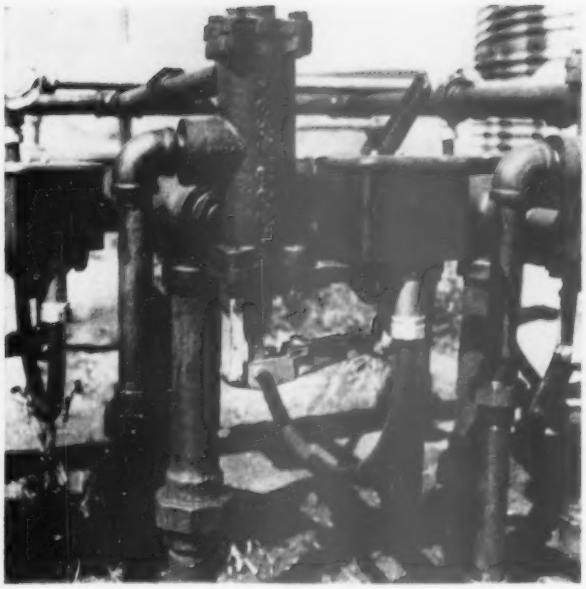
6a. Warning sign should be used on all automatically controlled equipment.

## Pumping Wells . . .

**Photos 5-6a.** Pacific Coast operators have for years been using time-clock switches for part-time pumping synchronized to the well's capacity. These switches installed on already electrified wells have cost $65 per installation and have permitted savings ranging from $50 per year to more than $150 per year through reduced power costs, subsurface maintenance costs, and operating labor costs.

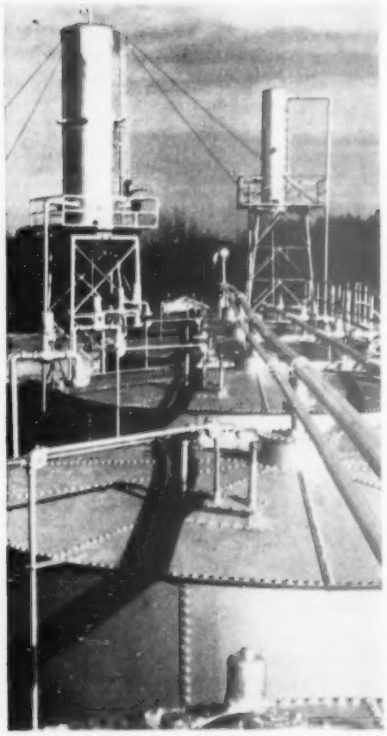
A typical installation at a well, together with the warning sign used by the Standard Oil Co. of California, is shown in Figs. 5, 6, and 6a.

Time-clock switches can be utilized with gas-engine-driven pumping units, also. In this case, however, the costs are appreciably greater, since full automatic controls must be coupled to the time-clock switch for closing circuits, cranking engine, engine starts, ceasing cranking engine, and shutting it down.



7. Solenoid-actuated header valve for tank switching.

8. Electric-motor-actuated header valve, tank switching.



10. Float switches and electric motor valves used for tank filling.

# Tank Switching; Topping Tanks . . .

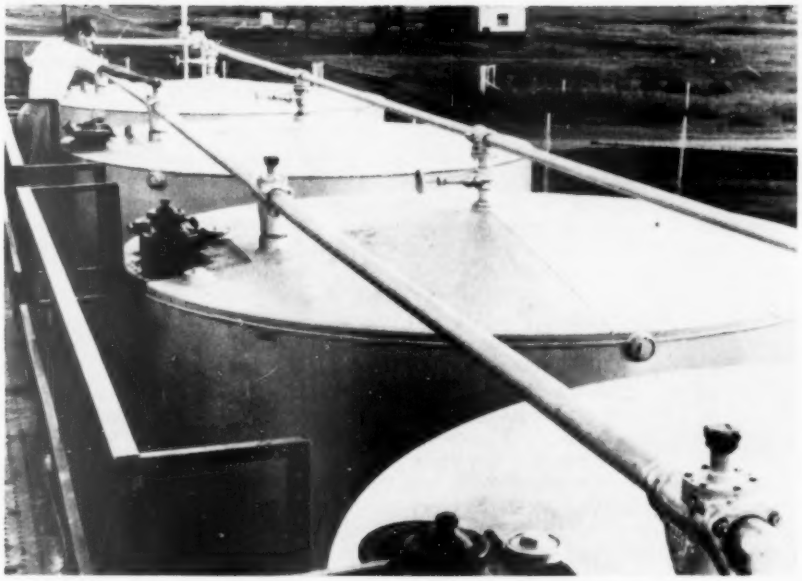
**Photos 7-10.** Because properties may not always be attended 24 hours each day, or because there are other duties having a higher priority, many operators are faced with the problem of getting adequate gages on their wells and/or making maximum use of the tankage available. These problems are not new, and many have been solved by adding manpower to do the job.

A better and more efficient solution may be to install automatic controls to do what the production men do not have time to do. Later this article will explain in detail what California Standard has done to develop the economics of utilizing complete automatic controls for gaging and shipping oil. However, it is desirable to mention some of the present uses operators are now making of mechanized and automatic control at their gage and stock tank settings.

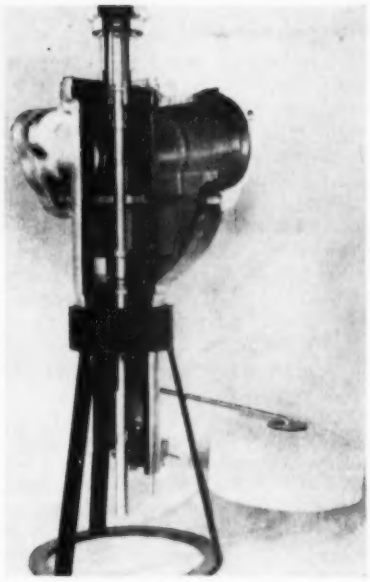
**Tank switching . . .** Tank-switching valves in common use today are of three general types: A solenoid-actuated valve such as shown in Fig. 7; an electric motor-driven valve such as shown in Fig. 8, and a diaphragm-actuated valve. All of these valves can be controlled with time clocks so that oil can be routed to a tank for a definite period at the end of which the oil is routed to another tank. Utilizing the valves in this manner, it is possible to get a gage on a well, even though the production man is not around or did not have time to physically switch the flow.

The cost as reported by Pistole and Sullivan[1] for equipping a battery of tanks with either electric-motor-driven or diaphragm-actuated valves, together with the necessary control circuits, would be about $700 per tank. It is expected that the use of solenoid valves would cost approximately the same.

**Topping stock tanks . . .** For years operators have been using overflow piping which permitted the excess oil in any one tank to spill over into the next tank or sump. This method, though it had certain advantages, did not permit the isolation of that tank from the continuing flow, nor could the tank be shipped until after the flow was physically switched to another tank. There are improved ways of topping out tanks today which not only incorporate the simplicity of the old overflow method, but also isolate the tank for later shipment of oil. One of the new methods available is to use a mechanical valve which is installed in a header above the tanks and, by means of a float, shuts off the flow to the tank when it is full, routing the flow of oil to the next tank (Fig. 9). Any tank can be bypassed by not resetting the mechanical valve on that tank. The cost to install these valves at a tank setting, exclusive of piping and depending on the size valve used, would range between $100 and $150 per tank. Fig. 9a illustrates the internal parts of this valve.



9. Mechanical tank switching valve used with overhead filling lines.



9a. Section mechanical tank switching valve.

Another method is the use of float or pressure switches[1] so that when the oil has reached a level to actuate a mercury switch, one automatic valve would shut and another automatic valve (to physically route the oil to another tank) would open. This, of course, is a variation on the automatic tank switching previously discussed, with the only difference being somewhat lower costs. (Fig. 10).

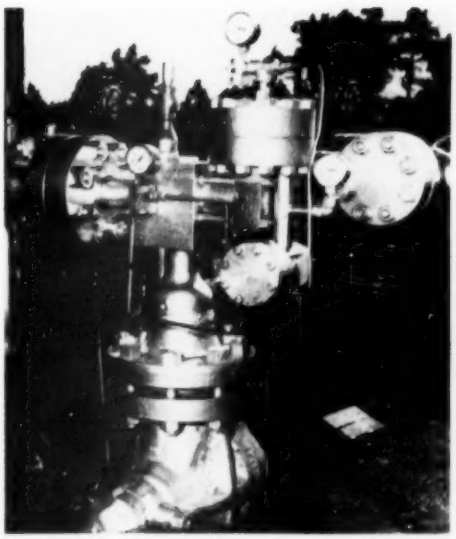
California Standard has recently installed automatic filling and switching valves on four tanks at one of its isolated stock tank settings. The economic justification for this approximate $2,600 expenditure, was to eliminate the hazard of overflowing a tank, to make full use of existing tankage, and to preclude the necessity of having to add another man to a pumping crew just to do routine tank filling. It is readily apparent this installation is well justified.

# Controls for Equipment Failures and Shut-In Emergencies

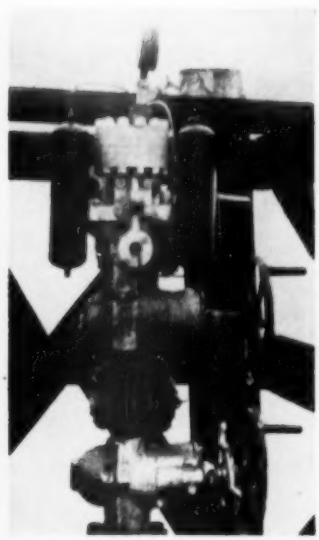
**Photos 11-12.** Equipment failure is not only costly from a repair standpoint but also from the possible loss of production, the fire hazard that may be created, and the property damage that may result. Because of the tremendous losses that can be suffered when oil is lost, a fire occurs, or property is damaged, many automatic controls have been developed to reduce the risk of having to pay for more than repair costs. Some of the devices developed operate on pressure changes, others on liquid level changes, and others on temperature changes.

Examples of some of the applications for these various automatic controls on production operations are:

**Shutting-in flowing wells . . .** Most of the valves used for this purpose utilize the well's pressure to close the valve and are so designed that they will remain open unless some abnormal pressure change occurs. Some operate on increases in line pressure: e.g., line plug-



11. Diaphragm valve, used for shutting-in well in emergency.



12. Diaphragm valve, on "offshore" platform, with emergency safeguard.

ging or freezing. Some operate on decreases in line pressure: e.g., line breaks or trap rupture, and some operate on both increases and decreases in line pressure. Two typical installations of both high and low-pressure shutoff valves are shown in Figs. 11 and 12. Installations such as shown complete with control piping will cost $650 per well. There are also electrically operated valves which, in the event of power failure, will automatically close to shut in the well. These same electrically operated valves can be so connected into circuits that, if there is no more storage capacity available, they will shut in lease production.

**Shutting-in pumping wells . . .** In this instance, the equipment needed is very simple. For a gas-engine-driven pumping unit, a pressure-actuated mercury switch (high, low, or both) is used to short-circuit the ignition system. For an electric-motor-driven pumping unit, again a pressure-actuated mercury switch (high, low, or both), is used and inserted in the holding circuit of the starter such that in the event of an abnormal high or low flow line pressure, the circuit would open, causing the motor to stop. A typical high and low **combination** of mercury switches for a 200 psi. flow-line pressure can be installed for $150. There are other shutdown devices available in the event of variations in engine oil pressure, operating temperature, load increase, speed, etc.

**Starting wells to produce . . .** Most of the automatic valves for shutting in a flow well, in cases of emergency, do not have automatic resetting features to put the well back on production after the emergency has passed. The choice of whether to provide the automatic resetting feature will depend on the type of the producing well. In some cases, even with automatic resetting provided, the well may not start flowing unless kick-off gas is supplied. Also, the individual characteristics of the well may require manual adjustments in starting it flowing again, which make the automatic resetting feature of little economic value. Therefore, no generalized rule can be established; and operators will have to examine each case on its own merits.

When electric-motor-driven pumping wells are shut in due to an emergency or power failure, they can be started again manually or automatically when opportune. There is a danger, however, in starting a large number of electric motors automatically and simultaneously, because of the high starting current requirements, which may be enough to blow all the fuses. This disadvantage can be overcome by inserting a time-delay relay, which, by adjusting between motors, will permit them to be started in sequence, thus staggering the starting current loads.

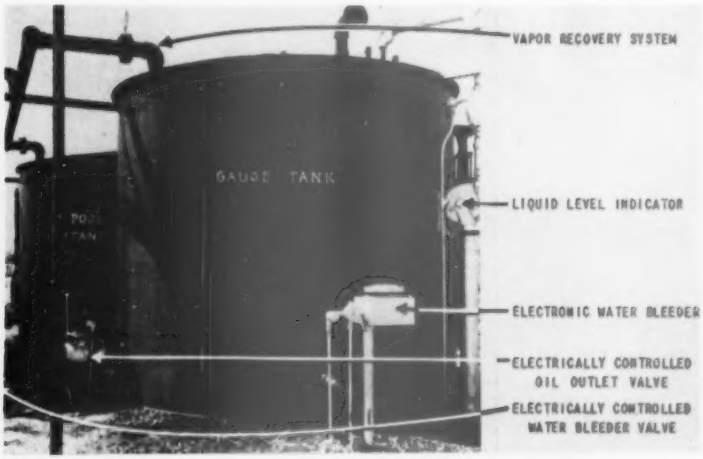
When gas-engine-driven pumping wells are shut in due to an emergency, it is best for some individual personally to check to find and correct the cause before trying to restart the gas engine.

# Automatic Gaging and Shipping . . .

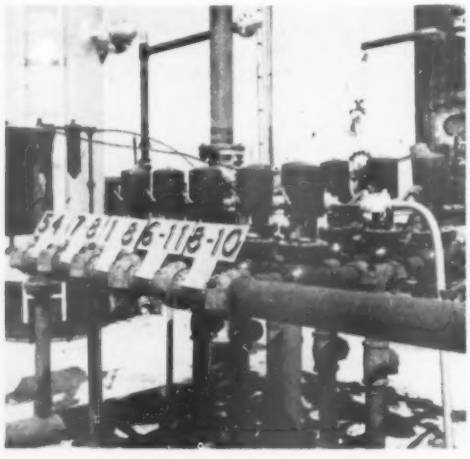
**Photos 13-23.** With the preceding brief summary of some of the more commonly used automatic controls, one may wonder what additional steps can be economically taken further to reduce the routine work production men must do. In an effort to combine many investigations into one study, California Standard installed a number of the previously mentioned controls, as well as some new controls, at a new tank setting in the San Joaquin Valley. This setting is really two completely automatic-gaging setups—one using an electronic oil-water cut measuring device[4] coupled to a conventional oil meter, the other using measured tank volumes of oil and water. Both setups are recording, so that all the production man has to do to get gages is to remove the marked charts and tapes. Inasmuch as there are two complete gaging setups, it is desirable to examine each separately.

**Automatic tank gaging . . .** This method of gaging combines, into an integrated system, many widely used component parts. When all these component parts are assembled (Fig. 13), and centrally controlled, they will do an accurate job of gaging as well as eliminating much routine work. The components parts used at this setting are:

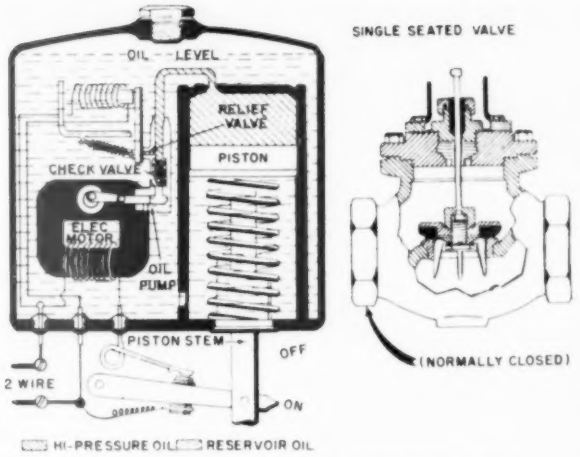
**1. The electric-motor-driven hydraulic header valves (Fig. 14) . . .** A schematic sketch (Fig. 15) illustrates the working parts of this valve.[5] When the circuit supplying current to the valve is closed, the small motor drives a hydraulic pump which forces the piston down to close the valve. Once the valve is seated, an integral switch shuts off the motor-driven hydraulic pump; and the



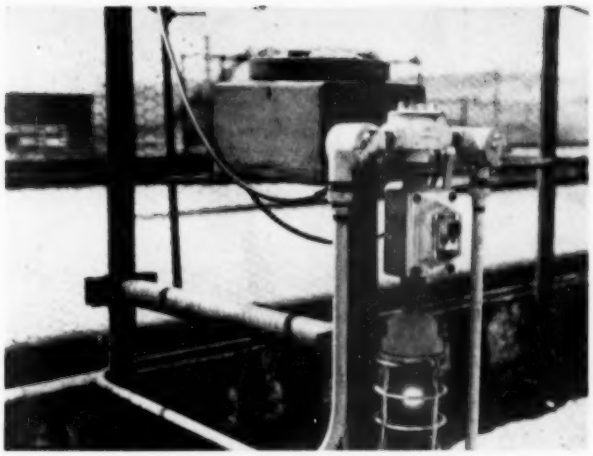

13. Identification of automatic devices used in tank gaging.



14. Electric-motor-driven hydraulic header valve.




15. Construction details of electric-motor-operated valve.



16. Electronic water bleeder, in use at oil-collecting basin.

solenoid-controlled relief valve holds the fluid behind the piston, keeping the valve closed. When the electrical current is interrupted, the relief valve opens, allowing the spring-loaded piston to return the valve to the open position.

The valves used in this header are of two general types—normally open (used on the pool tank header) and the normally closed (used on the gage tank header). These two types are used so that in the event of a power failure one valve will always be open. These valves operate on 110-volt, 60-cycle current and can be obtained with explosionproof housings if so desired. These 2-in. low-pressure valves shown will cost $90 each.

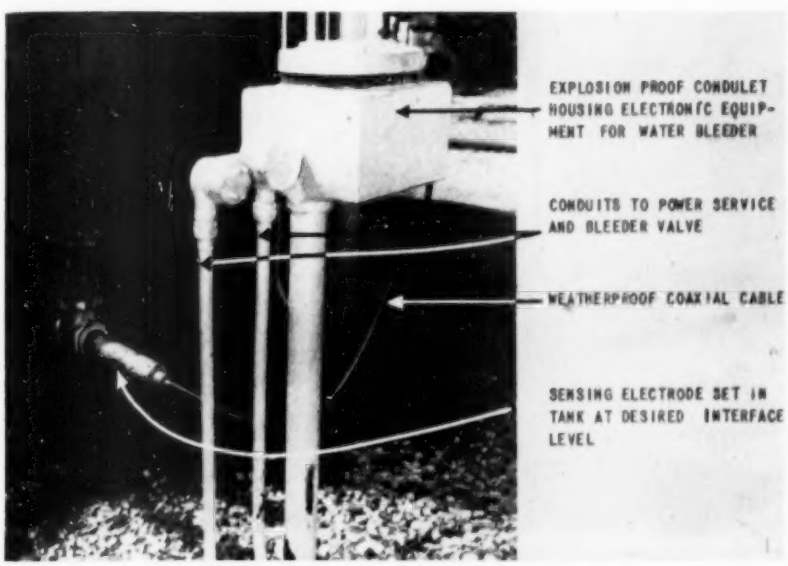
**2. The gastight tank liquid-level indicator (Fig. 17) . . .** This indicator has a guided float connected to a graduated metallic tape which can be read at a look-box window at the side of the tank. The small, oval-shaped element near the tank top is an electronic transmitter which is connected to an electronic receiver located at the central control panel. These mechanisms make it possible to read at a convenient location the liquid level in the tank.

The liquid-level indicator is gravity compensated and will accurately indicate liquid levels within ⅛ in. The approximate installed cost for the remote reading liquid-level indicator shown is $600.

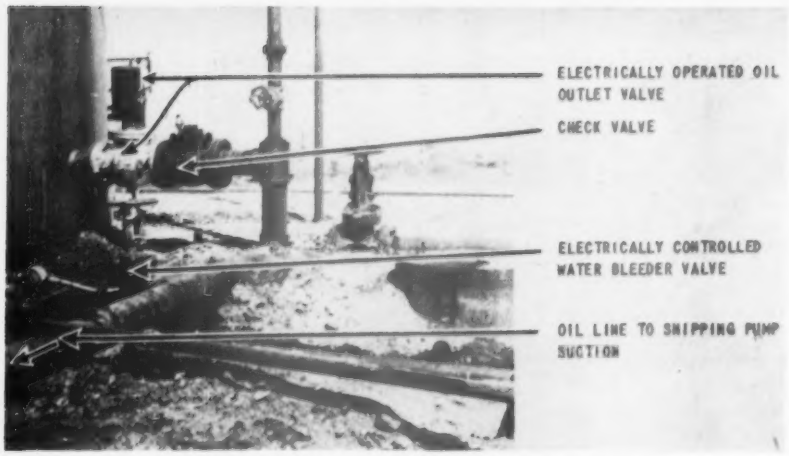
**3. Automatic tank water bleeder (Fig. 18) . . .** This bleeder is an electronic device[5] which will maintain an oil-water interface by automatically operating a valve in the bleeder line. The electrode, seen entering the valve on the side of the tank at the desired interface level, is essentially a capacitor energized by a source of low-power radio-frequency energy. The electronic equipment generating this energy is housed in an ex-

ELECTRONIC GAGER TRANSMITS TANK-LEVEL READING TO CONTROL PANEL
LIQUID-LEVEL INDICATOR LOOK BOX WHERE VOLUME IN TANK CAN BE READ

17. Gastight liquid-level indicator, with electronic transmitter.


EXPLOSION PROOF CONDULET HOUSING ELECTRONIC EQUIPMENT FOR WATER BLEEDER
CONDUITS TO POWER SERVICE AND BLEEDER VALVE
WEATHERPROOF COAXIAL CABLE
SENSING ELECTRODE SET IN TANK AT DESIRED INTERFACE LEVEL

18. Operational details for electronic automatic tank bleeder.


ELECTRICALLY OPERATED OIL OUTLET VALVE
CHECK VALVE
ELECTRICALLY CONTROLLED WATER BLEEDER VALVE
OIL LINE TO SHIPPING PUMP SUCTION

**19. Electric-motor-driven hydraulic valves, for water bleeding and oil discharge.**

plosionproof condulet and connected to the sensing electrode by a weatherproof coaxial cable.

The way this automatic bleeder senses the difference between oil and water is the capacitance change due to the different dielectric constants of oil and water. When the sensing electrode's capacitance is such as to indicate water is present, a circuit is closed, energizing the electric bleeder line valve. When the oil level drops enough to change the capacitance of the electrode, the circuit energizing the bleeder valve is opened and the valve closes.

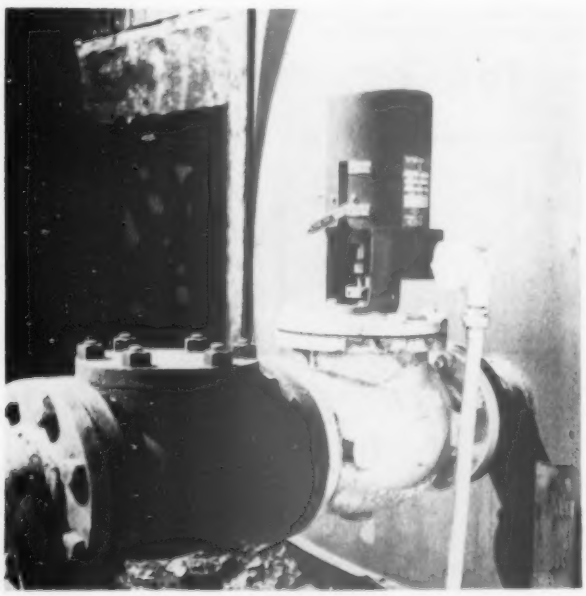
The bleeder valve is equipped with a time-delay mechanism to prevent it hunting. The tremendous difference in dielectric constant between oil and water permits considerable latitude in compensating for thick emulsion interfaces.

A number of these automatic tank bleeders have been installed by California Standard in places where conventional water legs would not work and manual bleeding is a necessity. In all cases they have economically reduced routine pumper time. Fig. 16 shows an installation at an oil-collection basin near Coalinga, Calif. The light showing indicates the water has been bled off to the desired level in the basin. The installed cost for a typical automatic tank bleeder, complete with 2-in. electric bleeder valve and interconnections, will approximate $600.

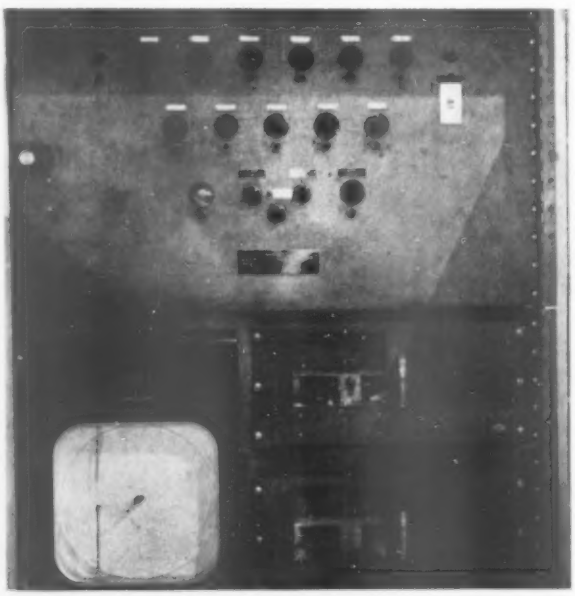
**4. The electric water-bleeding valve and the electric oil-outlet valve (Fig. 19) . . .** These two valves operate on the same principle as the other electric valves previously discussed. Both valves are the normally closed type, requiring an electric circuit to be closed in order to operate them. A closeup photograph of the oil-line valve, with its check valve, is shown in Fig. 20.

**5. The central control panel (Fig. 21).** The controls and recording equipment for both types of automatic gaging facilities are combined in this one panel. Each well is supplied with a selector switch and indicator light. These selector switches are set to establish the position you wish the well gaged. If a well is not producing or for some other reason you wish to omit it from the gaging sequence, you set the selector switch in the off position. When a well is on gage, the indicator light below the selector dial is lighted. The top row of eight selector switches is for those wells normally using the electronic cut measuring method of gaging; and the bottom row of five selector switches is for those wells normally using the automatic tank-gaging method.

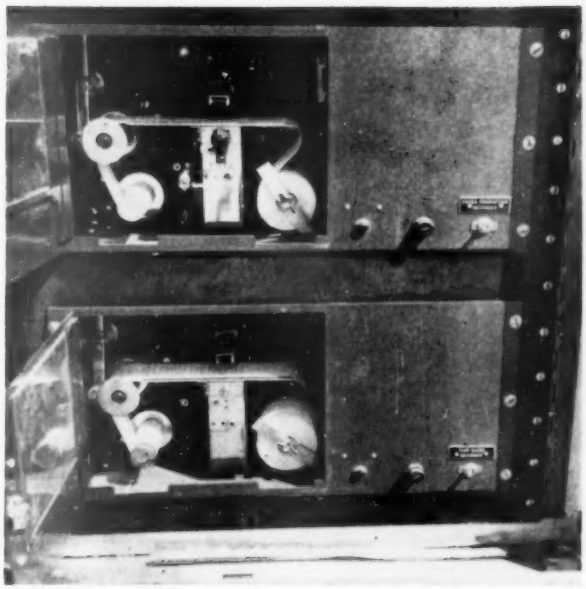
Below the individual well selector switches are three indicator lights which light to indicate "Shipping Pump On," "Water Bleeder On," and "Auxiliary Off." The dial to the right of these indicator lights is the "Manual Operation" switch and is used when a special gage is desired. The dial on the left of the indicator lights is the routing switch, which is used to interlock



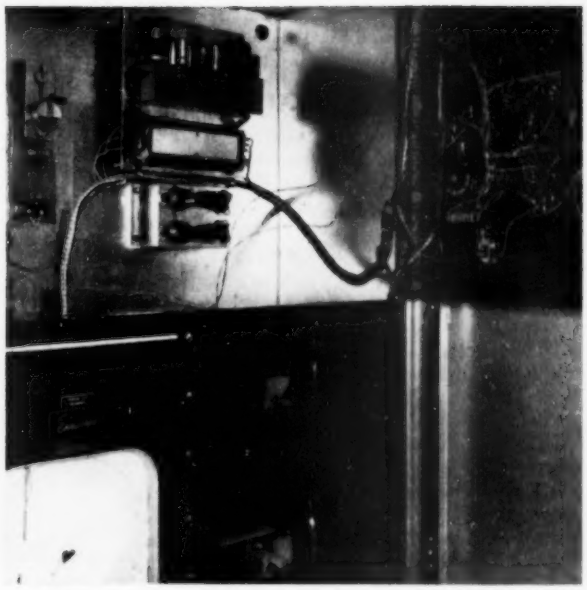
**20. Electric-motor-driven hydraulic valve and check valve, used in gage-tank oil-discharge line.**



**21. Central control panel used with tank and electronic cut measuring methods.**



22. Gross production printer for oil meter and tank-gage printer.



23. Circuits, time clocks, and electronic equipment in panel.

both methods of automatic gaging, so that, if desired, only one method of gaging could be used for all wells, or a combined meter and tank gage could be obtained for all wells; or by manually operated all the control circuits almost any combination of meter and tank gaging could be obtained.

In the lower left corner of the panel board is the electronic per cent cut recorder chart; and in the lower right corner are the gross volume printer for the electronic cut method of gaging, as well as the liquid-level printer for the automatic tank-gaging method. A closeup view of these two prints is shown in Fig. 22.

Some of the circuits, time clocks, switches, and electronic equipment housed at this central control panel are shown in Fig. 23.

The approximate installed costs for all the equipment housed at the central control panel, exclusive of the liquid-level transmitter and the electronic per cent cut recorder chart, are:

**COST OF ITEMS FOR CENTRAL CONTROL PANEL (SEE FIG. 23)**

| | |
|---|---|
| **1. Selector switches and indicator lights for 13 wells** | **$520** |
| **2. Automatic step switches, time clocks, circuits, etc., for both methods of automatic gaging** | **550** |
| **3. Tank gage recorder and printer** | **900** |
| **4. Electronic receiver drive for oil meter recorder and electronic per cent cut recorder chart** | **250** |
| **5. Gross fluid printer for oil meter** | **700** |
| **6. Panel board, less working parts above** | **200** |
| **Total** | **$3,120** |

# What Happens . . . and How . . . in Automatic Tank Gaging

WITH all the component parts assembled and their circuits controlled by stepping switches, time-delay relays, and time clocks at the central control panel, the general operation of the setting is as follows:

1. A well is switched into the gage tank when the circuits (selector switches) controlling the well's header valves are energized. (The gage-tank header valve opens and the pool-tank header valve closes.)

2. Through the use of a time clock, production from the well flows into the gage tank for 24 hours.

3. At the end of this 24-hour period, the circuit energizing the header valves is interrupted; and the valves return to their normal position (gage header valve closed and the pool header valve open).

4. After header valves return to their normal positions, the circuit to the liquid-level indicator is energized; and the electronic transmitters transmit to the central control panel the gross production (in barrels) in the tank. This gross production (oil and water), along with the well's number, is printed on a tape.

5. By the use of a second time clock, the production in the tank is allowed to settle for approximately 5½ hours.

6. At the end of this settling period, the automatic tank-bleeder circuit is energized by the time clock tripping a micro switch; and any water present is bled off until the interface is at the same level as the bottom of the oil-outlet line.

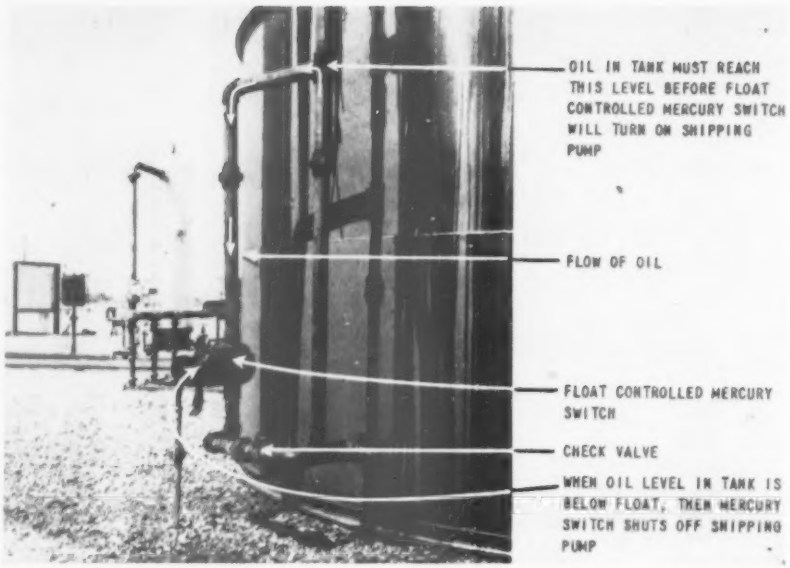
7. Following the water bleeder shutoff, there is a short time delay, after which the circuit to the liquid-level indicator is again energized, and the number of barrels of production in the tank is printed on the gage tape. (This is the net oil.)

8. As soon as the amount (in barrels) of net oil in the tank is printed on the gage tape, the circuit to the electric-motor valve on the oil-outlet line is energized, and the valve opens. One of the circuits controlling the electric-motor-driven shipping pump is also energized, and the oil is shipped to stock tanks some distance away.

9. When all the oil available in the tank has been shipped, a float controller interrupts the circuits energizing the oil valve and pump. The oil valve then returns to its normally closed position, and the shipping pump shuts down.

10. When the oil valve closes, step switches move to control the header valve circuit on the next well; and the gaging sequence starts again. The total time to make this individual well gage is 30 hours.

During the same period of time that a well is on gage, the production from all other wells going to this setting is collected and shipped wet from the pool tank. The use of a pool tank serves two purposes in that it reduces the back pressure on the well pumps and provides a storage place for oil during the interim period it may take to restore power to the setting. To reduce the starting and stopping of the shipping pump, the pool tank has been equipped with a float-controlled mercury switch, so that the liquid in the tank has to reach a certain level before the pump is started. The pump, once started, continues to pump the oil and water until the tank level is low enough to drop the float controlling the mercury switch, which, in turn, stops the shipping pump motor (Fig. 24).


OIL IN TANK MUST REACH THIS LEVEL BEFORE FLOAT CONTROLLED MERCURY SWITCH WILL TURN ON SHIPPING PUMP
FLOW OF OIL
FLOAT CONTROLLED MERCURY SWITCH
CHECK VALVE
WHEN OIL LEVEL IN TANK IS BELOW FLOAT, THEN MERCURY SWITCH SHUTS OFF SHIPPING PUMP

**24. Float-controlled mercury switch for starting and stopping shipping pump.**

There have been no operational difficulties or maintenance problems with either this automatic tank-gaging setup or these pool-tank collection and shipping facilities.

# Electronic Oil-Water Cut Measurement

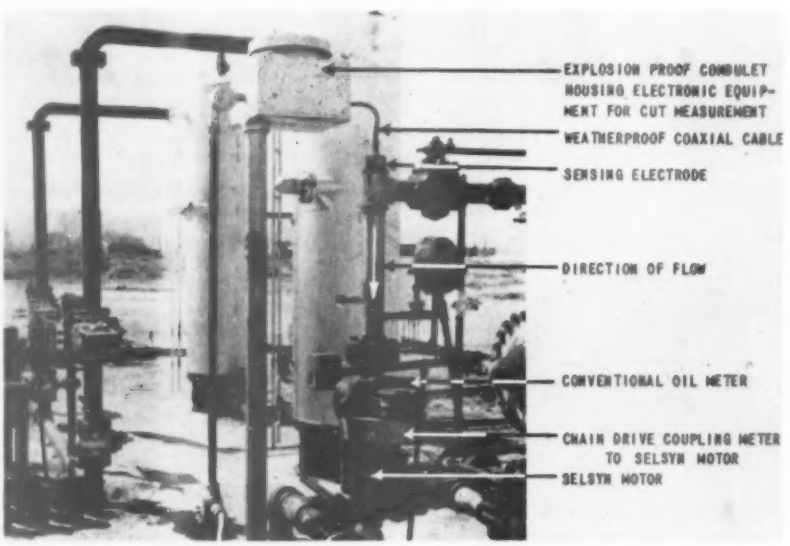
THIS method of gaging combines into an integrated system some widely used, and one relatively new, component parts. When all these component parts are assembled (Fig. 25), working properly, and centrally controlled, they can also do an accurate job of gaging as well as eliminating much routine work. The component parts used in this gaging setup are:

**1. Electric-motor-driven hydraulic header valves.** These are the same as previously discussed.

**2. The electronic cut-measuring device.** This instrument will determine the per cent of water in oil that passes through a given pipe line. The electrode seen entering the vertical pipe above the oil-volume meter (Fig. 25) is a capacitor, usually comprised of two concentric cylinders energized by a source of radio-frequency energy. The electronic equipment generating this energy is housed in an explosionproof condulet and connected to the electrode by a weatherproof coaxial cable.

The way the cut-measuring device operates is much the same as with the electronic water bleeder. In this instance, however, as the amount of water in oil flowing by the electrode changes, so does the capacitance. These capacitance changes are then translated into per cent of water in oil and automatically recorded on a chart. A complete electronic cut-measuring device, complete with selsyn motor-driven recorder, but exclusive of oil-volume meter, can be installed for approximately $800.

**3. The oil-volume meter.** The meter used is conventional. However, instead of being coupled to a counter the meter is equipped with an electronic transmitter-receiver device which controls the counter at the gross production recorder shown in Fig. 22.


EXPLOSION PROOF CONDULET HOUSING ELECTRONIC EQUIPMENT FOR CUT MEASUREMENT
WEATHERPROOF COAXIAL CABLE
SENSING ELECTRODE
DIRECTION OF FLOW
CONVENTIONAL OIL METER
CHAIN DRIVE COUPLING METER TO SELSYN MOTOR
SELSYN MOTOR

**25. Electronic cut measuring device and volume oil meter.**

# What Happens in Electronic Oil-Water Cut Gaging

Again with the component parts assembled and their circuits controlled, the general operation is as follows:

**1. A well is switched** onto gage when the circuits (selector switches) controlling the header valves for that well are energized. The way this is accomplished is: The time clock rotates its trip arm every 24 hours. When the trip arm depresses a micro switch, step switches energize the circuit for the next well to be gaged and the gage header valve opens while the pool header valve closes.

**2. The production** (oil and water) flows through the electronic cut meter, and the per cent of water in the oil is instantly recorded on a circular chart at the central control panel.

**3. The production continues** through the oil-volume meter, and the electronic transmitter at the control panel drives the counter and the circular chart recording the per cent cut. It is desirable to drive the cut-recorder chart by the meter, so that if slugs of oil and water are produced, the per cent figure will be with respect to volume rather than time.

**4. At end of 24-hour** gage period, the time-clock rotating arm again trips the micro switch, which energizes the printing attachment on the electronic receiver counter; and the gross gage of oil and water is printed on the tape along with the well number.

**5. Simultaneously with the printing** of the gross gage, stepping switches move the next well to be gaged into position interrupting the current in the circuit for the well just gaged, thereby allowing the header valves for the well to return to their normal position (gage header valve closed and pool header valve open); and the gaging sequence continues with the next well. Since the electronic method of gaging is a continuous cut-measuring method, no physical samples are taken and all production goes to the pool tank. To find the net production, the average per cent cut of the water in oil is taken from the cut-recorder circular chart and applied to the gross fluid oil meter reading. Although these two gaging facilities are presently set to take 24-hour gages, the equipment can be set to gage for any desired period of time.

The experience to date with these two completely automatically gaging facilities has resulted in the production men being able to spend ½ hour per day on more productive work. This in itself may not be good economic justification. However, when considering the various component parts worked well on an integrated system, full use was made of the existing tankage, more gages were taken than would have been taken under conventional manual operation, and a good possibility that the gages recorded were more accurate, it is felt the trial conducted has conclusively proved there can be good economic justification for utilizing some, if not all, of the component parts when the proper situation is present.

Based on the experience gained with these gaging facilities and the experience others have had with automatic devices, California Standard is currently working on plans for several new semiautomatic gaging facilities.

## . . . and in conclusion

From the foregoing it should be apparent that many mechanical and automatic devices have application in oilfield production operations. In most instances the devices used have clearly demonstrated they can do as good if not a better job on routine, repetitive production activities than can the production men themselves. Although these devices have the application and can do a good job, they are not a panacea for all situations. However, where operators are faced with 24-hour per day lease operations and only part-time lease coverage, many of the devices will demonstrate good economic justification.

How far operators are willing to go with the use of automatic gaging and controlling equipment is dependent upon what they see in the way of benefits to be gained. It is the writer's opinion that when considering (1) part-time pumping synchronized to the well's capacity; (2) good and frequent gages of individual well production; (3) tank switching to avoid overfilling; (4) water bleeding; (5) automatic gage and pool tank shipping, and (6) shutting in production in event of failure or emergencies, it should not be difficult to determine when and if automatic devices will provide the desired service at the most economical cost.

The automatic and mechanical devices described here are only a partial answer to the challenge of finding new and better ways of doing things. The extent to which these known ways are utilized, and the continued development of other ways which may be still better, are up to the individual operator. The challenge is still there, and the savings to be realized await those who have the requirement and the imagination to progress.


### Acknowledgment

The author wishes to express appreciation to J. E. Toussaint and to other members of management of Standard Oil Co. of California for having granted permission to prepare and publish this paper and acknowledges the capable assistance of E. E. Gialdini of Standard Oil Co. of California. Paper presented at spring meeting, Pacific Coast District, A.P.I. Division of Production, Los Angeles, 1953.


### Bibliography


1. "Application of Automatic Controls to Wells and Tank Batteries in the East Texas Area," paper by Harry Pistole and Bruce Sullivan, of Humble Oil & Refining Co., The Oil and Gas Journal, April 28, 1952, p. 97.

2. "Automatic Production Controls," by J. E. Kastrop, World Oil, March 1952.

3. "Automatic Operation of Flowing Oil Wells and Tank Batteries," by J. N. Poore, Petroleum Engineer, August 1948.

4. "Continuous Electronic Recording of Water Content of Oil-Field Emulsions," by P. O. Engelder, Petroleum Engineer, April 1951.

5. General Controls Catalog—No. 53G.

6. Oil Well Water Locating Co. Catalog, 2230 Lemon Avenue, Long Beach 6, Calif.


### Other Articles on This Subject


"Operation of Submarine Pipe Line and Production Facilities in the Gulf of Mexico," by G. W. Osborne and F. S. Bird, presented at Fifth Annual Petroleum-Mechanical Engineering Conference, Sept. 25, 1950, New Orleans.

"Remote-Reading Gages at Ponca City," by F. C. Whiteside, The Oil and Gas Journal, Sept. 21, 1951.

"Nine Fully Automatic Leases Installed in East Texas Field," by W. I. Nance and J. M. Payne, The Oil and Gas Journal, August 10, 1950.

"Automatic Lease Operation," by George Weber, The Oil and Gas Journal, August 5, 1948.

"Automatic Lease Flow Controls," by D. H. Stormont, The Oil and Gas Journal, January 20, 1949.

"The Phantom Pumper," by L. S. McCaslin, Jr., The Oil and Gas Journal, Aug. 2, 1947.

"Automatic Flow and Tank Batteries" article, Petroleum Engineer, August 1948.

"Remote Tank Gaging," by D. H. Stormont, The Oil and Gas Journal, February 1, 1951.

*How to estimate*

# Corrosivity of Crude Oils

Here are two approaches to objective of finding method whereby a refiner may compare performance of a known crude against the probable performance of an unknown crude

**by H. A. Cataldi,* R. J. Askevold,† and A. E. Harnsberger‡**

EVALUATION of crude oils from new fields for estimation of potential corrosion rates on refinery equipment has been the concern of an A.P.I. subgroup. Efforts have been largely directed to corrosion at elevated (above 600° F.) temperatures. The objective is to develop a practical method of determining relative corrosiveness of various crude oils or charging stocks, so that the refiner will be able to predict the probable performance of an unknown oil vs. the corrosiveness of an oil with which he has had experience. Standard Oil Co. (Ind.) and Pure Oil Co. methods are described here. The Pure Oil research was directed to the corrosive effect of sulfur compounds.

It is expected that further work along this line will be done and participation within the industry is invited.

## 1. Indiana Method

Most of the conventional methods for measuring rapidly the rates of corrosion of steel in such substances as crude oil, such as those concerned with changes in weight, are either tedious or completely infeasible.

A method based on the change in the electrical resistance in a specimen has been described by A. Dravnieks.[1] It is very sensitive and uniform tarnish thicknesses of the order of 1 microinch can be measured readily. Furthermore, by the use of a recorder, the corrosion may be followed continuously.

In the method developed by Standard Oil Co. (Ind.) for the evaluation of the corrosivity of crude oils, a steel specimen 0.001 in. thick is exposed to a definite volume of the crude oil, in a bomb, for a fixed length of time at a constant temperature and pressure. The amount of corrosion is determined by measuring the electrical resistance of the specimen both before and after the exposure. Since the width of the specimen is much greater than its thickness, any changes in width can be ignored. Therefore, changes in the electrical resistance are inversely proportional to the thickness.

It is implied that the corrosion is uniform, and that the conductivity of the scale is small. Whether these assumptions are responsible can be checked readily for each different application of the method. Only relative values of voltage and current are measured, making the determination of relative (or percentage) change of resistance a simple matter. The precision of the electrical measurements is better than 0.1 per cent.

### Test Results

Results of the laboratory tests performed on the 22 crude oils submitted by the nine cooperating companies were coded and arranged in order of increasing corrosivity (Table 1). The corrosivities are expressed both as per cent corrosion (i.e., per cent of the test-specimen thickness removed) as determined by the test, and as per cent of the average of the worst West Texas sour crudes. For obtaining this latter rating, the per cent corrosion values for the four most corrosive crudes, i.e., "DG," "CD," "QE," and "HJ," were averaged and assumed arbitrarily to be 100 per cent. The percentage ratings of the other crudes then were calculated relative to this average value. Obviously such a rating at best is a rough one.

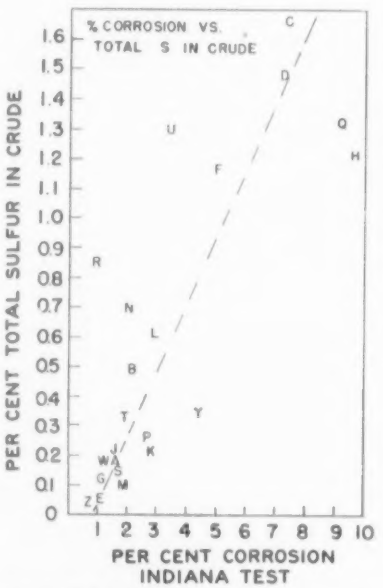



**Fig. 1—Relationship between the per cent corrosion as given by the Indiana test method and the per cent of sulfur in the whole crude. (To simplify plotting only the first letter of the crude code symbol has been plotted in each case.)**

When data obtained in short-time tests are analyzed, the average rates measured are influenced greatly by the initial rate of attack on clean metal. The results, therefore, are conservative. Rates on equipment with accumulated scale and coke can be expected to be lower. However, all laboratory tests have the shortcoming that various plant design factors may affect the actual rates of penetration considerably. This variable is almost impossible to evaluate in any tests.

### Effect of Various Factors

**Sulfur and acidity** . . . Table 1 also shows the results of analyses for total sulfur and for acidity (neutralization number) for each oil, made both before (on the whole crude oil) and after (on the residue left in the bomb) the corrosion test runs. In Fig. 1 the original sulfur content is plotted against the per cent of corrosion found by the Indiana test. As expected, most of the oils, within broad limits, indicate an increase of corrosion with increasing sulfur content. Thus, in the usual case, unstable sulfur compounds seem to account for most of the corrosion. A few oils, however, lie significantly outside the band. For instance, oils "FG," "RE," "NB," and "UC" show less corrosion than might be expected from the sulfur content; whereas oils "HJ," "QE," and "YF" show more.

No apparent correlation was found between the change in the sulfur content of the oil during the test and the corrosiveness. One might suspect such

*Standard Oil Co. (Ind.), Chicago. †The Pure Oil Co., Crystal Lake, Ill. ‡The Pure Oil Co., Chicago.

# REFINERY PROCESS NEWS

PUBLISHED BY REFINERY PROCESS DIVISION, THE M. W. KELLOGG COMPANY JULY 1953

## First Inverted Orthoflow Unit Completed Soon

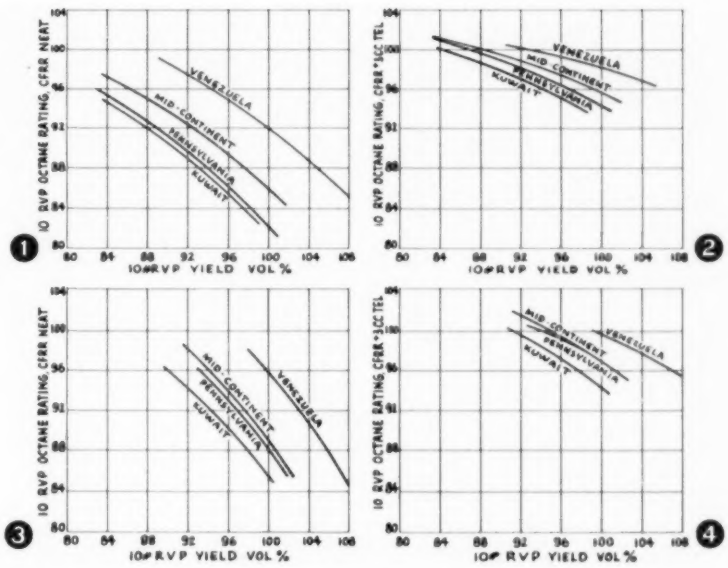
Shown here as it passed the 75%-completion point is the first of the new type Orthoflow Fluid catalytic crackers. It is currently about to be placed on stream at a major Mid-western refinery.

Known as the Model "B" Orthoflow, it is a variation of the original Orthoflow design. Principal reason for the new design, with the regenerator above the reactor, is the expected reduction in the operating costs in comparison with the conventional Model "A" unit, several of which are now operating in the United States and Canada.

The regenerator of the Model "B" design operates at a lower pressure than the reactor in order to maintain the required flow within the system. Thus compressed air is being charged to the vessel which is at the lower pressure as opposed to the situation in the conventional Orthoflow where the regenerator is operated at the higher pressure.

Eleven Orthoflows, including both types are now either in operation or under construction. With fresh-feed capacities ranging from 2,500 to 28,000 BPD, they are located virtually all over the world. They all represent marked simplification in the Fluid catalytic crack-

(Continued on following page)




## Sinclair-Baker Catalyst Promises Substantially Lower Operating Costs and Increased Yields

Employing the recently announced Sinclair-Baker platinum catalyst — a joint development of Sinclair Research Laboratories, Inc. and Baker & Company — Kellogg's new catalytic reforming process is expected to produce excellent yields of high octane product from a wide variety of feed stocks.

The new catalyst is a regenerative type and has two major advantages over existing commercial platinum catalysts: (a) the catalyst maintains high activity over considerably longer periods of time, resulting in substantially lower catalyst operating costs, and (b) it has a greater ability to convert low octane paraffinic components to high octane aromatics.

In addition to this ability to aromatize paraffins, the undesirable hydrocracking of feed to butane and lighter gases is minimized, more hydrogen being produced. Further, the regenerative properties of the catalyst provide means of reactivating it in place in case of process upsets. Regenerative processing gives maximum catalyst life, in terms of barrels of production per pound of catalyst, while maintaining optimum yield-octane ratios.

Catalytic reforming at moderate pressure with this catalyst is summarized by the yield-octane curves shown above for typical naphthas. Figure ① presents the data for 10# RVP clear research octane and Figure ② the data on a leaded basis — both for continuous processing. Figures ③ and ④ give the data for the regenerative process for 10# RVP clear and 3cc leaded bases.

In all cases, outside butane may be used to produce 10# RVP reformate. Low $C_3$-and-lighter gas yields reflect the selectivity of the catalyst. The high net hydrogen production offers an important refinery source of $H_2$ for desulfurization and petrochemical processing.

Since it is now fairly certain that the octane demands for future automotive transportation will require naphtha reforming, the choice of one of several reforming processes becomes important. The selection should take into account royalties, yield/octane ratios and catalyst productivity. Preliminary data indicate that reformate production will range from 20 to over 200 bbls. per pound of catalyst, depending upon the feed stock and the product quality required. Direct operating costs for labor, utilities and maintenance should not exceed $0.20 per barrel of reformate.

# REFINERY PROCESS NEWS

CONTINUED FROM PRECEDING PAGE

## Inverted Orthoflow.... cont.

ing process from a mechanical engineering standpoint... and have continued to display the overall ease of operation typical of the Fluid process.

Tests during a period of more than three months also prove that the catalyst loss factor of the Orthoflow is now as low as that of the best side-by-side Fluid units. A simple modification in the regenerator of the first domestic Orthoflow has radically reduced the amount of catalyst lost with the flue gases.

This particular unit was originally designed for an 8,300 BPD throughput. Operating on synthetic MS catalyst it is now running regularly at 9,300 BPD, with conversion at 67%. Despite a certain amount of naphtha in the feed, debutanized gasoline averages 93 octane clear.

The other units in operation substantiate the fact that the Orthoflow is simple to operate, produces good yields of high quality products, and the minor modifications made to effect catalyst saving do not alter its basic design advantages or increase its investment cost.

## New Australian 70,000-BPD Refinery Well Underway; Will Include Orthoflow

Big things are happening in Australia. Search for oil goes on in the Exmouth Gulf area, and seventeen miles from Fremantle, Australia's largest refinery is being built at Kwinana (see photo) under Kellogg supervision for AIOC. When it comes on stream in 1955, it will process 70,000 BPSD supplying 49% of the country's current needs.

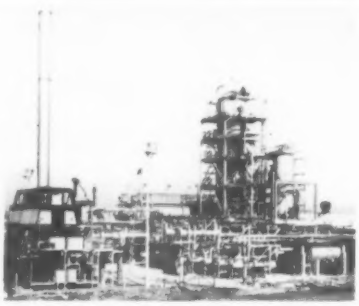
Included in the plant will be two 35,000 BPD atmospheric distillation units—complete with stabilizers, solutizers, and caustic washers—plus a 24,000 BPD vacuum unit. The catalytic cracking plant will be of the new Kellogg Orthoflow Fluid design, similar to units in the U.S. and Canada which are matching the performance records of conventional side-by-side crackers.

### Plant Includes Hydrofiner

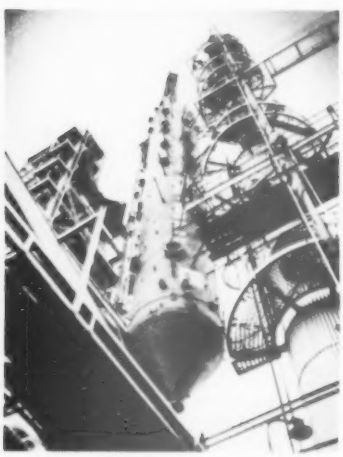
Hydrofining will be used for desulfurizing kerosene and gas oil. Hydrogen for this operation will be obtained from the catalytic reforming unit also being installed.

## England's First Deasphalter on Stream

The Kellogg International Corporation, which erected the unit to a Kellogg design, has placed this propane deasphalter on stream at Kent, England. Part of an entirely new refinery, the plant has a capacity of 4,500 barrels per day. It is the first unit of its type to be installed in the British Isles.



*For further information, technical data, etc., on any refining process, write*



## Like a Candle Into a Candlestick

...goes this 65-ton fractionating column into a Fluid catalytic cracker in England. Designed by Kellogg it is 106 feet long and 14 feet in diameter. When in service it will handle approximately 10,000 BPD of cracker effluent daily.

When finished, this will be the third Fluid catalytic cracker Kellogg has completed in the British Isles within the past few months.

REFINERY PROCESS DIVISION

THE M. W. KELLOGG COMPANY

225 Broadway, New York 7, N. Y.

Also Jersey City, Los Angeles, Tulsa, Houston, Toronto, London and Paris

KELLOGG — SUBSIDIARY OF PULLMAN

TABLE 1—LABORATORY AND EXPERIMENTAL CORROSION TEST DATA OF STANDARD OIL CO. (IND.) AND EVALUATION SUMMARY OF RESULTS

| Crude-oil description and code— | Sulfur[1] (per cent) | | Neutralization number[2] | | Corrosion measured[3] (%) | Corrosion relative to W. Texas crude[4] (%) | Assigned degree of corrosiveness | |
|---|---|---|---|---|---|---|---|---|
| | Initial | Final | Initial | Final | | | From experimental data[5] | From refinery's data[6] |
| Tomball (ZF) | 0.05 | 0.09 | 0.74 | 1.37 | 0.55 | 7 | Mild | 5 per cent of West Texas |
| Van Zandt (RE) | 0.85 | 0.93 | 2.03 | 0.28 | 0.76 | 9 | Mild | Mild |
| Gulf Coast light (GJ) | 0.12 | 0.20 | 1.72 | 1.71 | 1.10 | 13 | Mild | Less than HJ |
| South Sumatra (EG) | 0.05 | 0.11 | 1.10 | 0.12 | 1.13 | 14 | Mild | 5 to 10 per cent of West Texas |
| West Texas light (WF) | 0.18 | 0.34 | 0.51 | 1.19 | 1.30 | 16 | Mild | 10 per cent of West Texas |
| Scurry County, Texas (JH) | 0.20 | 0.37 | 0.62 | 1.14 | 1.55 | 19 | Moderate | Mild, less than KH |
| East Texas sweet (AD) | 0.19 | 0.36 | 0.56 | 0.91 | 1.55 | 19 | Moderate | 2.5 per cent of West Texas[7] |
| Southern Illinois (SE) | 0.16 | 0.16 | 1.05 | 0.24 | 1.70 | 21 | Moderate | Mild |
| Mixed Wyoming (MA) | 0.11 | 0.20 | 0.77 | 1.14 | 1.76 | 21 | Moderate | Mild |
| Ordovician (NB) | 0.17 | 0.17 | 0.78 | 1.14 | 1.99 | 24 | Moderate | Mild to extreme,[8] 50 per cent of West Texas |
| West Texas sweet (BD) | 0.48 | 0.94 | 1.07 | 0.85 | 2.09 | 25 | Moderate | No data available |
| Sweet mix of North Texas, Oklahoma, and West Kansas (TC) | 0.38 | 0.53 | | 0.10 | 2.34 | 28 | Moderate | Mild to moderate |
| Pipe-line mix of semisweet West Texas, Illinois, Oklahoma, East and North Texas (PB) | 0.26 | 0.42 | 0.54 | 0.91 | 2.64 | 32 | Severe | Moderate at least |
| Greenwood and Butler counties, Kansas (KH) | 0.22 | 0.34 | 1.07 | 2.05 | 2.66 | 32 | Severe | More than JH; mild |
| Rangely, Colorado (LA) | 0.61 | 0.94 | 1.60 | 0.85 | 2.92 | 35 | Severe | Severe (three times MA) |
| West Texas-New Mexico sour (UC) | 1.30 | 1.64 | | 0.13 | 3.80 | 46 | Severe | Severe |
| Panhandle (YF) | 0.35 | 0.25 | 0.53 | 1.76 | 4.42 | 54 | Severe | 80 per cent of West Texas |
| Quiriquire (FG) | 1.17 | 1.26 | 6.82 | 0.94 | 4.99 | 61 | Severe | 75 per cent of West Texas |
| West Texas (DG) | 1.48 | 1.68 | 1.12 | 0.77 | 7.16 | 100 | Extreme | Extreme |
| West Texas sour (CD) | 1.67 | 1.66 | 1.24 | 1.08 | 7.36 | 100 | Extreme | Extreme |
| Yates, West Texas (QE) | 1.32 | 1.24 | 2.53 | 0.16 | 9.01 | 100 | Extreme | Extreme |
| West Texas-New Mexico sour (HJ) | 1.21 | 1.49 | 1.12 | 1.36 | 9.55 | 100 | Extreme | More than GJ |

1. Per cent sulfur determined by the quartz-tube method; "initial" values are from whole crude as received; "final" values are from residue left in bomb after test.

2. Neutralization number determined by titrating colorimetrically to a phenolphthalein end point; "initial" values are from whole crude as received; "final" values are from residue left in bomb after test.

3. Per cent corrosion is per cent decrease in specimen thickness as computed directly from change in electrical resistance during the test.

4. These are rough estimates made relative to the average of the per cent corrosion values for the four most corrosive crudes (i.e., for DG, CD, QE, and HJ), and assuming that these four represent 100 per cent.

5. This is an arbitrary classification made in such a way as to be in best agreement with the refinery's estimates.

6. A more complete summary of the refinery's estimates is given in Appendix I hereinafter.

7. This was a relative rate based upon the use of 4 to 6 per cent chromium tubes.

8. Higher temperatures and rates of flow and heat transfer made this crude extremely corrosive, although normally it was classed as only mildly corrosive.

a relation if the corrosion were mainly caused by thermally unstable sulfur compounds. However, the lack of correlation with sulfur content might be explained by the presence in some crudes of considerable amounts of volatile, although noncorrosive, sulfur compounds.

Similarly, no relation was found between neutralization number and corrosiveness.

**Pressure . . .** The effect of pressure (in the range of atmospheric to 120 psig.) was variable. In some crudes the corrosion was a sensitive function of the pressure; in others the effect was slight. This indicates that the corrosive constituents were distributed differently, i.e., according to volatility, in the oils.

**Aging . . .** Table 2 shows the effects of aging at room temperature on the corrosiveness of an arbitrarily chosen crude oil. The corrosivity of this oil increased as it aged in the container. After 4 months again its corrosivity at 800° F. had increased to about two and one-half times its corrosivity when first received. This may be the result of oxidation, or of some other less obvious change in the oil. Such an effect may have a significant bearing on the apparent discrepancies in the laboratory results found in the case of some of the oils.

TABLE 2—EFFECT OF AGING AT ROOM TEMPERATURE ON THE CORROSIVENESS OF A CRUDE OIL

(Each number indicates the result of a separate Indiana corrosion test, i.e., per cent corrosion)

| Temp. of test (° F.) | Time after initial test (months) | | | |
|---|---|---|---|---|
| | 0 | 1 | 3 | 4 |
| 400 | .. | .. | 0.9 | 1.3 |
| | .. | .. | 0.7 | 1.0 |
| 500 | .. | .. | 0.8 | 1.3 |
| | .. | .. | 1.1 | 1.4 |
| 600 | .. | .. | 1.5 | 2.0 |
| | .. | .. | 1.6 | 1.6 |
| 700 | .. | .. | 3.5 | 5.4 |
| | .. | .. | 3.0 | 2.9 |
| 800 | 1.6 | 2.4 | 4.7 | 5.4 |
| | 1.8 | 2.3 | .. | 4.4 |
| | 1.9 | .. | .. | .. |
| | 1.8 | .. | .. | .. |
| | 1.7 | .. | .. | .. |
| | 2.0 | .. | .. | .. |

## General Applicability

The Indiana method was used for a few tests on vapor-phase corrosion and may be used for investigating the corrosivity of various liquids and vapors in refinery streams. It already has been employed to investigate various refinery corrosion problems which resulted from hot oils, from acids, and from other aqueous media at ambient and elevated temperatures. The method gives a direct measure of the amount of corrosion, whatever its cause. However, the results must be interpreted with due regard to possible effects of the relative volatilities of the components of the oil under the test conditions used.

## 2. Pure Oil Method

Attention has been directed by Pure Oil Co. more specifically to the corrosive effect of sulfur compounds, particularly under conditions of high temperature and pressure. The corrosive action resulting from other agents such as, for example, unstable inorganic chlorides, can be predicted with a fair degree of certainty, and means are usually available to counteract the effect. On the other hand, although corrosive action often is proportional to sulfur content, there are so many exceptions that total sulfur content of a crude oil cannot be relied upon as a measure of corrosivity. Accordingly, it was decided that some measure of the relative activity of sulfur in various crude oils was necessary.

Experiments were carried out to measure the quantity of hydrogen sulfide released from various crude oils at different temperatures. There is no assumption that the hydrogen sulfide itself is the corrosive agent but, instead, that it is merely a measure of the momentarily corrosive agent atoms which result from the breakdown of the parent sulfur compound. It would be expected that, in an environment where metals were being actively corroded, the release of hydrogen sulfide would be diminished by the amount of metallic sulfide being formed.

**Experimental . . .** Three crude oils upon which long refining experience had given a very reliable picture of corrosiveness were chosen to test this reasoning. These were first topped to 500° F. to remove gasoline and dissolved hydrogen sulfide; then they were subjected to very rapid heating to a series of different temperature levels and held at these levels for short periods of time, and the evolved hydrogen sulfide was measured in each case. These results are shown in Table 3. From examination of these data it was decided that 850° F. gave results which correlated best with known refinery corrosion experience on these three crude oils.

**Results . . .** Experimental conditions having been established whose results correlated with the three known crude oils, the same test was then applied to each of the crude oils of then unknown corrosion behavior which had been submitted by members of the Subcommittee on Corrosion of the A.P.I. Committee on Refinery Equipment. The hydrogen sulfide evolved for each crude oil is expressed as grams per 100 ml. on the topped crude, and also as per cent of that evolved from West Texas sour crude oil, the most corrosive oil examined in this series. These results are shown in Table 4, together with corrosion histories which have since been reported by each refiner.

These latter data have been translated into a scale of four adjectives which describe corrosiveness ranging from "mild" to "extreme." For comparison, the numerical results were then empirically translated into these same adjectives; and it will be seen that, with one outstanding exception, viz., that of Rangely crude oil, predicted corrosiveness is in reasonably good qualitative agreement with refining experience. This exception may be the result of the action of other corrosive agents, although salt content and organic acid content are not outstandingly different from this oil.

**TABLE 3—PURE OIL CO. DATA ON KNOWN CRUDE OILS**

| Crude oil— | Corrosion experienced in refining | Sulfur content (per cent by weight) Whole crude | Topped crude | Hydrogen sulfide released from topped crude (grams per 100 ml.) 900° F. | 850° F. | 800° F. | 750° F. | 700° F. |
|---|---|---|---|---|---|---|---|---|
| Van Zandt | Mild | 0.86 | 1.23 | Nil | Nil | | | |
| Illinois | Mild | 0.17 | 0.22 | 0.0016 | 0.0012 | Nil | Nil | Nil |
| Yates | Extreme | 1.37 | 1.59 | 0.0375 | 0.0197 | 0.0013 | Trace | Nil |

### Reference

1. A. Dravnieks, J. Am. Chem. Soc. 72, 3761 (1950).

**TABLE 4—EXPERIMENTAL CORROSION TEST DATA OF THE PURE OIL CO. AND EVALUATION SUMMARY OF RESULTS**

| Crude-oil description and code— | Sulfur content (per cent by weight) On crude | On topped crude | Hydrogen sulfide released at 850° F. (grams per 100 ml.) | Per cent hydrogen sulfide released relative to West Texas crude | Assigned degree of Corrosiveness From experimental data | From refinery's data |
|---|---|---|---|---|---|---|
| Van Zandt (RE) | 0.86 | 1.23 | Nil | <1.0 | Mild | Mild |
| Rangely, Colorado (LA) | 0.63 | 1.02 | Nil | <1.0 | Mild | Severe (three times MA) |
| Mixed Wyoming (MA) | 0.15 | 0.23 | Nil | <1.0 | Mild | Mild |
| Tomball (ZF) | 0.10 | 0.20 | Nil | <1.0 | Mild | 5 per cent West Texas |
| South Sumatra (EG) | 0.14 | 0.23 | Trace | <1.0 | Mild | 5 to 10 per cent West Texas |
| East Texas sweet (AD) | 0.27 | 0.46 | Trace | <1.0 | Mild | 2.5 per cent West Texas |
| Gulf Coast light (GJ) | 0.16 | 0.25 | 0.0006 | 1.1 | Mild | Less than HJ |
| Southern Illinois (SE) | 0.17 | 0.22 | 0.0012 | 2.2 | Mild | Mild |
| Scurry County, Texas (JH) | 0.24 | 0.49 | 0.0019 | 3.4 | Mild | Mild (less than KH) |
| West Texas sweet (BD) | 0.53 | 0.81 | 0.0033 | 6.0 | Mild | (*) |
| Pipe-line mix of semisweet West Texas, Illinois, Oklahoma, and East and North Texas (PB) | 0.29 | 0.52 | 0.0035 | 6.3 | Mild | Moderate at least |
| Greenwood and Butler counties, Kansas (KH) | 0.26 | 0.39 | 0.0045 | 8.1 | Mild | Mild (more than JH) |
| West Texas light (WF) | 0.24 | 0.43 | 0.0047 | 8.5 | Mild | 10 per cent West Texas |
| Sweet mix of North Texas, Oklahoma, and West Kansas (TC) | 0.47 | 0.65 | 0.0073 | 13.2 | Mild | Mild to moderate |
| Ordovician (NB) | 0.21 | 0.35 | 0.0115 | 20.8 | Moderate | 50 per cent West Texas† |
| West Texas-New Mexico sour (UC) | 1.52 | 2.15 | 0.0262 | 47.5 | Severe | Severe |
| West Texas-New Mexico sour (HJ) | 1.24 | 2.00 | 0.0359 | 65.0 | Severe | Severe (more than GJ) |
| Quiriquire (FG) | 1.31 | 1.42 | 0.0392 | 71.0 | Severe | 75 per cent West Texas |
| Yates, West Texas (QE) | 1.44 | 1.89 | 0.0440 | 100 | Extreme | Extreme |
| West Texas (DG) | 1.76 | 1.93 | 0.0475 | 100 | Extreme | Extreme |
| Panhandle (YF) | 0.37 | 0.53 | 0.0478 | 100 | Extreme | 80 per cent West Texas |
| West Texas sour (CD) | 1.76 | 2.01 | 0.0818 | 100 | Extreme | Extreme |

*Data not available †Mildly corrosive in one unit, and extremely corrosive in a similar unit which has higher rates of flow and heat transfer.

# Practical Application of Fluid Hydraulics...

## *to drilling in California*

Partially by trial-and-error methods operators and bit manufacturers combined their experience to solve most of the questions on technique of jet drilling

**by Gene D. Thompson***

**A RECENT survey indicates 90 per cent of the 200 rotary drilling rigs in California are power rigs. Over 85 per cent of these are equipped with 4½-in. o.d. drill pipe, drill 9⅞ or 10⅝-in.-diameter hole, and have a single slush pump rated at less than 400 hydraulic horsepower. A second slush pump of equivalent capacity is normally maintained for standby purposes and mixing mud. About 10 per cent of these rigs are equipped with a third pump or mud agitator, to permit parallel pump operations.**

**With the exception of a few of the smallest rigs, the majority of those operating in California have sufficient pump capacity and prime movers to effect a noticeable improvement in bit performance, by adjusting the volume of mud circulated in relation to the nozzle velocity to obtain the maximum product. In most cases, minor changes in the equipment will be necessary to utilize the available hydraulic horsepower to maximum advantage. The basic difference is the requirement for a high-pressure, medium-volume circulating system rather than the conventional medium-pressure, high-volume system.**

Running a jet-type bit in the hole without proper consideration of the horsepower available and circulating system will not result in improved bit performance. A practical knowledge of hydraulic equipment is required to prevent the circulating pressure from exceeding the capacity of the power pump.

In Humble's operations, better utilization of the available hydraulic horsepower, improved mud programs, properly designed bit programs, use of larger drill collars and higher bit weights and foresight in purchasing new rig equipment have all contributed to a reduction in drilling cost.

*Petroleum engineering section, California area, Humble Oil & Refining Co. Portion of paper presented at spring meeting, Pacific Coast district, Division of Production, American Petroleum Institute, Los Angeles, June 2-3, 1953.

### Hydraulic Principles of Rock Bit Drilling

Conventional rock bits rely on relatively low fluid velocities through large water courses directly above the cutters to clean the bit and hole. Although an appreciable increase in circulating rate will improve this cleaning action and, in most cases, the drilling rate, the bit footage life is substantially decreased by excessive erosion of the cutters. This disadvantage has been eliminated by the jet-type rock bit; however, it must be recognized that exceptionally low nozzle velocities could increase balling-up tendencies due to insufficient turbulence and, consequently, decrease the drilling rate. A jet-type rock bit must rely on high fluid velocities to disintegrate and remove the cuttings rapidly from bottom to eliminate the lost energy of regrinding and cuttings. Tests to determine the exact relationship of hydraulic and mechanical factors to bit performance are now in progress.

### Jet-Type Bit Performance

Results of using a special duplex sub, which permits conversion from conventional to jet water courses without round-tripping the drill pipe, have indicated increases in drilling rate of 50 per cent or more at constant bit weight and rotary speed. The sub contains a spring-loaded valve plate which is rotated by a cam each time the pump is started, thereby alternating the type of water courses in the bit. One of the typical tests which illustrates the advantages of jet over conventional type water courses is shown in Fig. 1.

The drilling-rate curves in Fig. 2 graphically illustrate the effect of nozzle velocity on the rate of penetration for jet-type rock bits at varying bit weights. These results indicate that when drilling at constant circulating rates and rotary speeds, the maximum weight which may be applied without balling up the bit increases as the nozzle velocity is increased. Under these conditions the drilling rate is essentially a linear function of the bit weight up to that point at which the bit begins to ball up.

Although these balling-up points will differ for the many types of bits and formations, these data emphasize an important fact—little can be expected from increased nozzle velocities unless

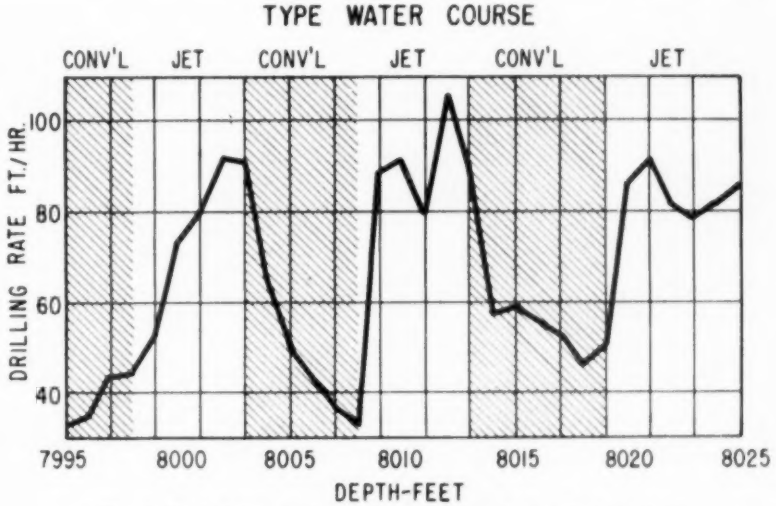
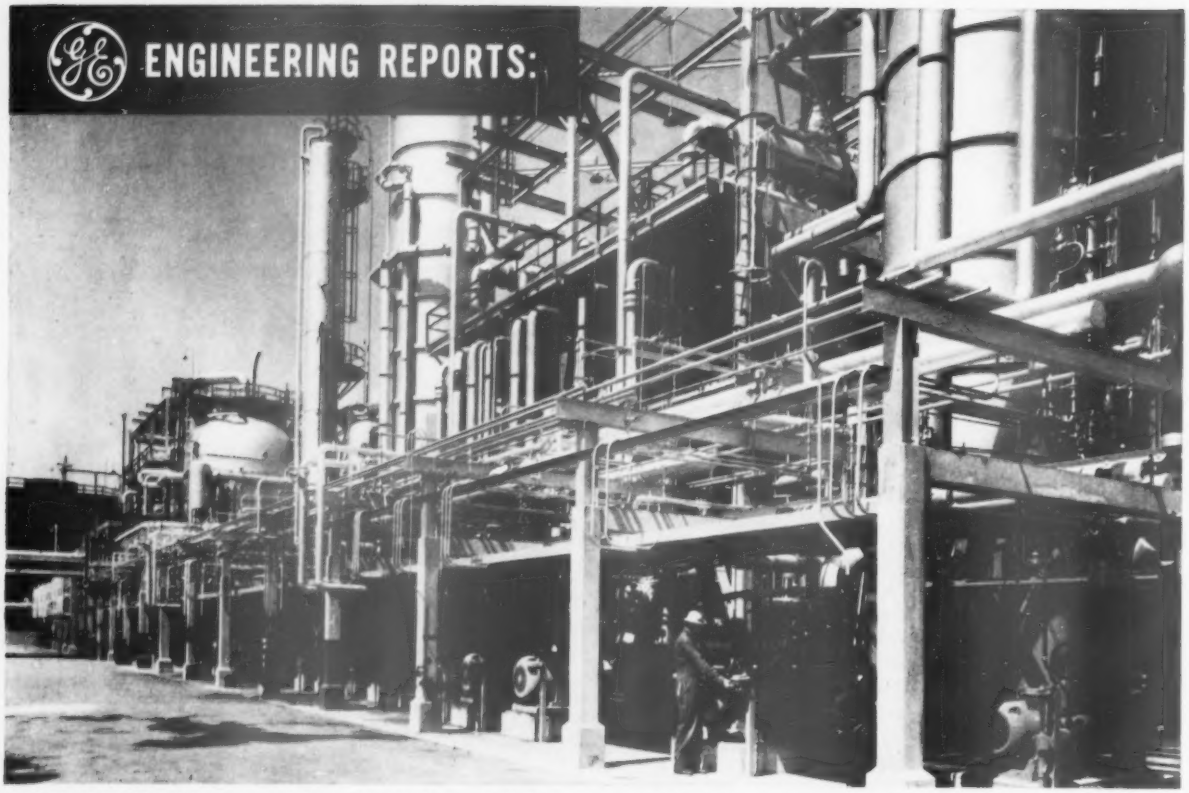



**Fig. 1—Typical test results using the duplex sub in soft formation.**

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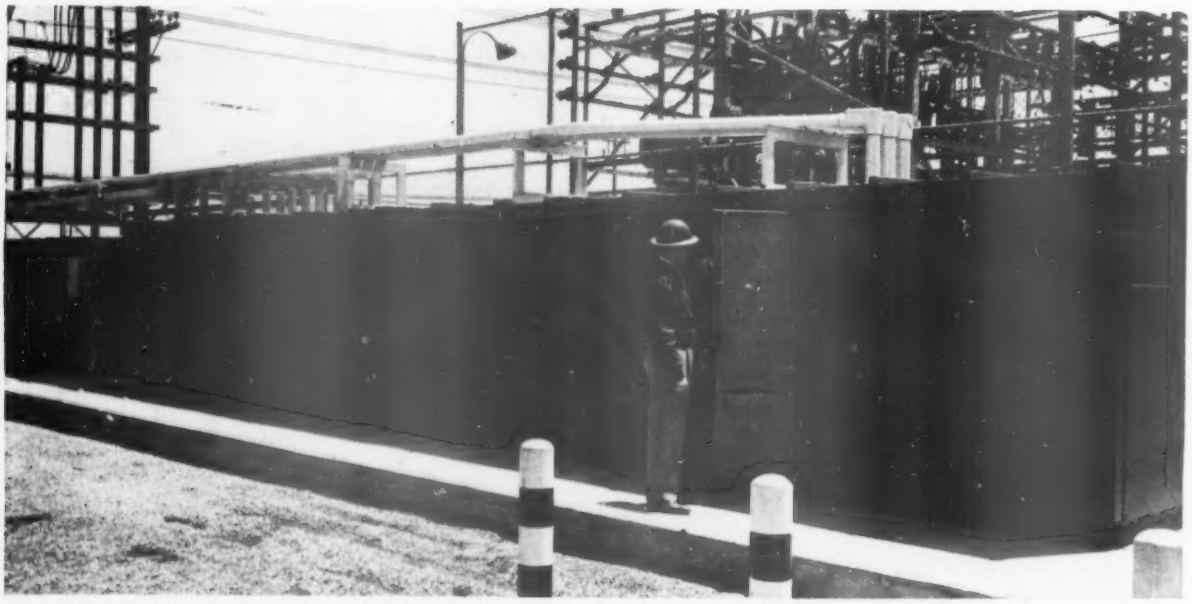

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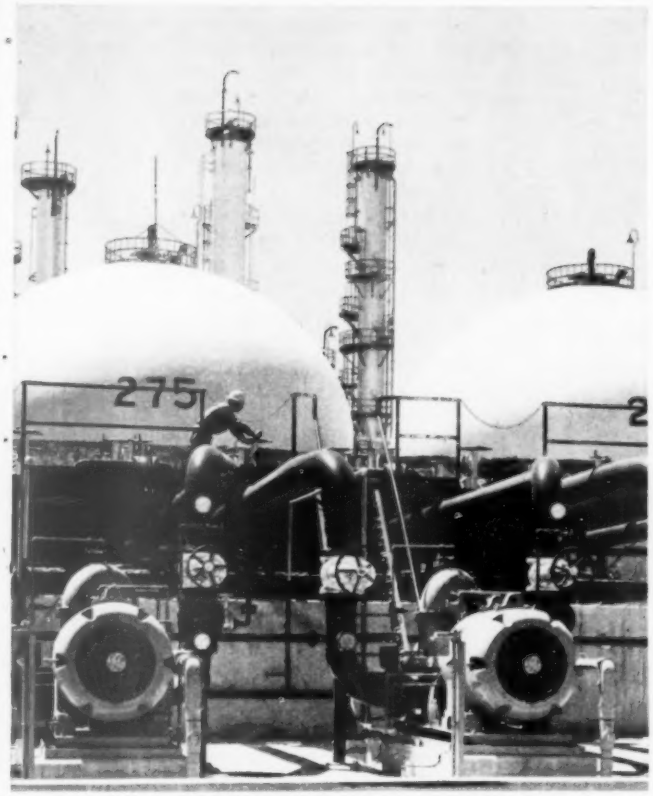


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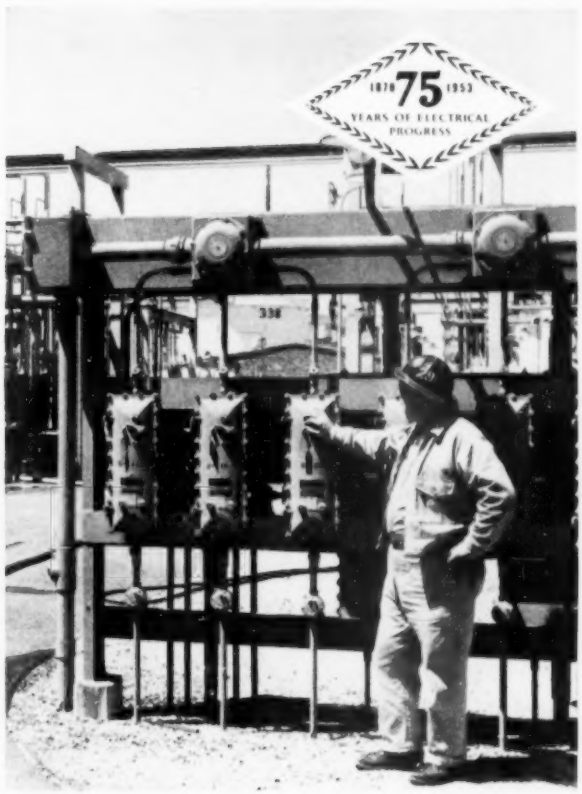


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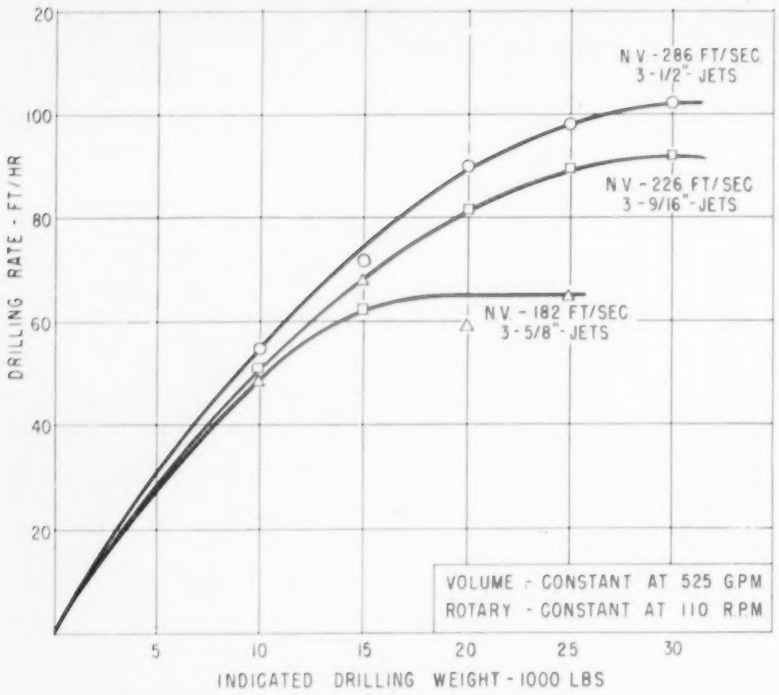

N V - 286 FT/SEC
3 - 1/2" - JETS
N V - 226 FT/SEC
3 - 9/16" - JETS
N V - 182 FT/SEC
3 - 5/8" - JETS
VOLUME - CONSTANT AT 525 GPM
ROTARY - CONSTANT AT 110 R.P.M
DRILLING RATE - FT/HR
INDICATED DRILLING WEIGHT - 1000 LBS

**Fig. 2—Effect of nozzle velocity and bit weight on rate of penetration of jet rock bits.**

accompanied by a proportional increase in bit weight or unless the bit is balled up prior to increasing the nozzle velocity. The rate of increase in penetration rate with bit weight will depend largely on the hardness of the formation and will vary from 1:1 to as low as 1:10 for extremely hard formations. This is principally due to the necessity of exceeding the compressive strength of the formation in order to pass from the stage of wearing out to that of chipping and fracturing the formation.

Controlled field tests have also established that in most formations the penetration rate of jet-type rock bits is a linear function of the rotary speed and that the rate of increase is dependent on the formation hardness. A rotary speed must be selected in conjunction with the bit weight for each depth and type formation to provide the maximum penetration rate at the most economical drill-pipe service. Since a practical application of jet-type bits does not permit both maximum attainable bit weight and rotary speed, it has been developed that it is usually more beneficial to reduce rotary speed and maintain the higher weight.

In addition to the effect of these factors, the penetration rate of rock bits is also influenced by the physical properties of the drilling fluid. With all other conditions constant, the use of a mud may reduce the drilling rate obtainable with water by as much as 50 per cent. The magnitude of this reduction is dependent upon the quantity and type of suspended solids in the mud. It is possible to retard this tendency of the bit to ball up in most cases by higher circulating rates or by an alteration of mud properties.

If moderately heavy muds are desired, it has been found advantageous, so far as the drilling rate is concerned, to obtain the increased density by means of a high-quality weighing material, with small additions of bentonite if necessary, rather than by use of clay alone. Excessive mud weights will load the pump capacity prematurely since the pressure losses in a circulating system are directly proportional to the mud density. Consideration should also be given to modifying such restrictions as small i.d. surface piping, drill pipe, and drill collars to extend the economical depth of improved bit performance.

Laboratory and field tests have determined that the drilling rate is directly proportional to the filtration loss and inversely proportional to the solid content. It was also indicated that the increase in drilling rate normally obtained with oil-emulsion muds is due to lubrication effects, which results in a high percentage of the surface-indicated bit weight being effective on bottom.

The minimum mud-return velocity is a factor that should be determined in each field for the different type muds and hole sizes. Annular velocities of

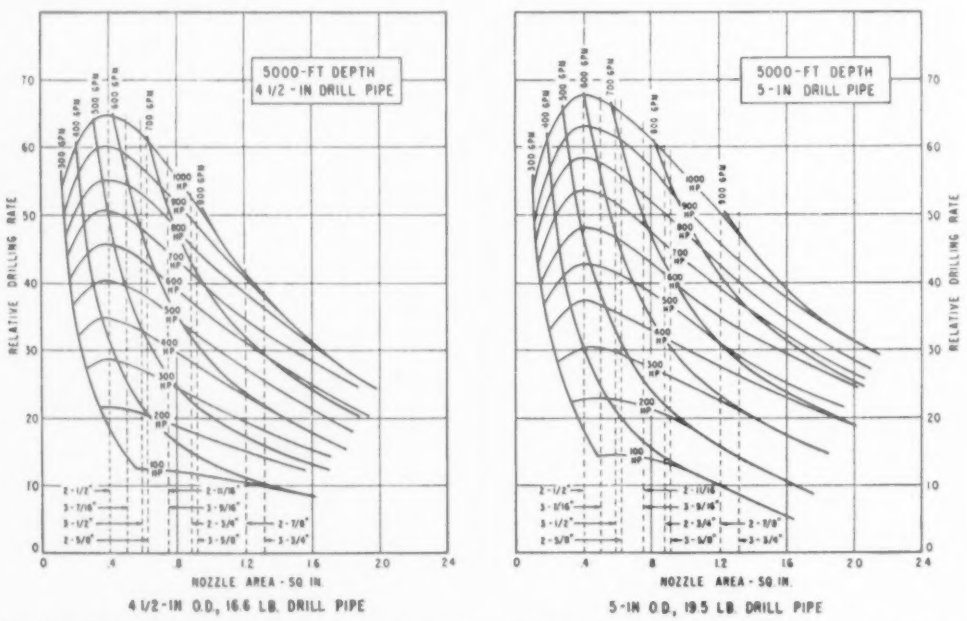
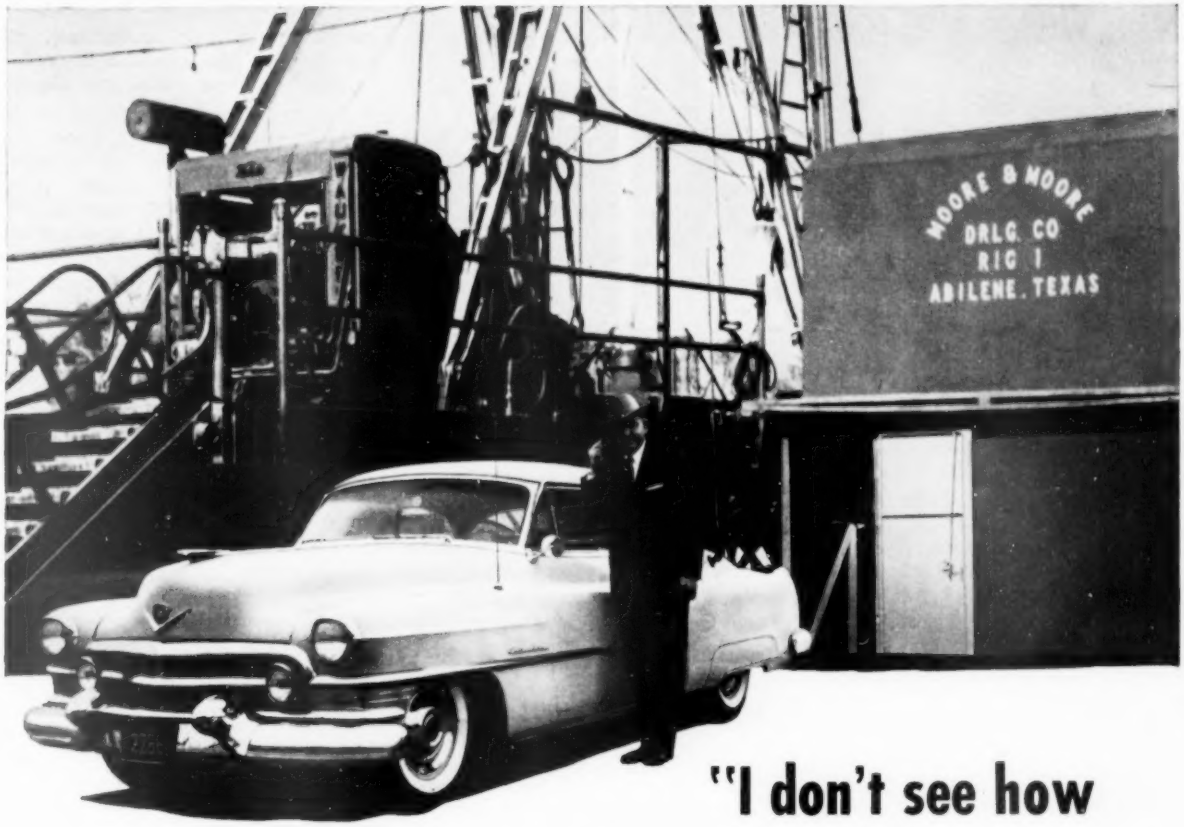

5000-FT DEPTH
4 1/2 - IN DRILL PIPE
5000-FT DEPTH
5 - IN DRILL PIPE
RELATIVE DRILLING RATE
NOZZLE AREA - SQ IN.
4 1/2-IN O.D., 16.6 LB. DRILL PIPE
5-IN O.D., 19.5 LB. DRILL PIPE

**Fig. 3—Relation of drilling rate, nozzle area, circulating rate, and hydraulic horsepower at 5,000 ft. (10.3 lb./gal. or 77 lb./cu. ft. mud and 0.9 nozzle coefficient).**

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150 to 160 ft. per minute have proved adequate for most operations on the West Coast; velocities as low as 100 ft. per minute have been used successfully in some instances for drilling rates of 10 to 15 ft. per hour at depths below 10,000 ft. Reduced hole sizes or large drill pipe will assist in attaining a safe mud-return velocity with a lower rate of circulation.

Current field data indicate that a nozzle fluid velocity greater than 225 ft. per second is necessary with 9⅞ or 10⅝-in. bits to effect consistently a significant increase in both penetration rate and footage per bit.

Controlled field tests are now in progress to further evaluate the hydraulic factor and penetration rate of jet-type bits in all types of formations. This research by Humble has shown that at the maximum effective bit weight just short of the balling-up point, the penetration rate is directly proportional to either the horsepower losses or impact forces at the bit. By mathematical substitution in available hydraulic formulas for pressure in a mud system it is possible to show that these horsepower losses are directly proportional to the product of the circulating rate and square of the nozzle velocity; whereas, the product of the circulating rate and nozzle velocity is directly proportional to the fluid impact. One major operator, conducting similar experiments in Louisiana, has recently concluded that the latter relationship, impact force, is the controlling factor in their tests.

Inasmuch as the optimum operating conditions, determined by the maximum from the constant hydraulic horsepower curve, do not vary appreciably for the different depths normally drilled by jet bits. Fig. 3 can be used as a general guide in selecting most practical liner and nozzle sizes for most rigs in California.

### Curves for Average Rig

Pressure-drop curves for an average rig, using nozzle sizes most adaptable to present California practices, are illustrated in Fig. 4 for 4½-in. drill pipe. These pressure-volume curves for the three ⅞ or two 18-in. and three ½ or two 5/8-in. nozzles, based on average cross-sectional areas and 90 per cent pump volumetric efficiency, check within 96 to 98 per cent of the field data using water-base muds. Constant pump horsepower, nozzle velocity, impact force, and horsepower losses through the bit have been included to further assist in determining the practical nozzle and liner program for a particular rig. For convenience, the impact force has been shown relative to circulating rate and nozzle velocity.

Assuming the drilling rate to be directly proportional to the total impact force of the jets, for example, typical programs for different pump capacities have been sketched in Fig. 4 to illustrate a method of effectively maintaining the maximum product of the circulating volumes and nozzle velocity. Should the drilling rate prove to be directly proportional to the horsepower loss through the bit, it can be mathematically shown that smaller nozzle sizes with still higher pump pressures would be required at optimum conditions. In either case, the pump pressure is a critical factor which becomes increasingly significant with depth. A closer approach to optimum conditions than generally outlined is not practical with current hydraulic equipment and large hole size.

As illustrated in Fig. 4, it is advisable to operate the pumps at less than maximum speed after obtaining the maximum recommended discharge pressure, in many cases, rather than change liner or nozzle size immediately. Most controls on power rigs are sufficiently versatile to permit a gradual reduction

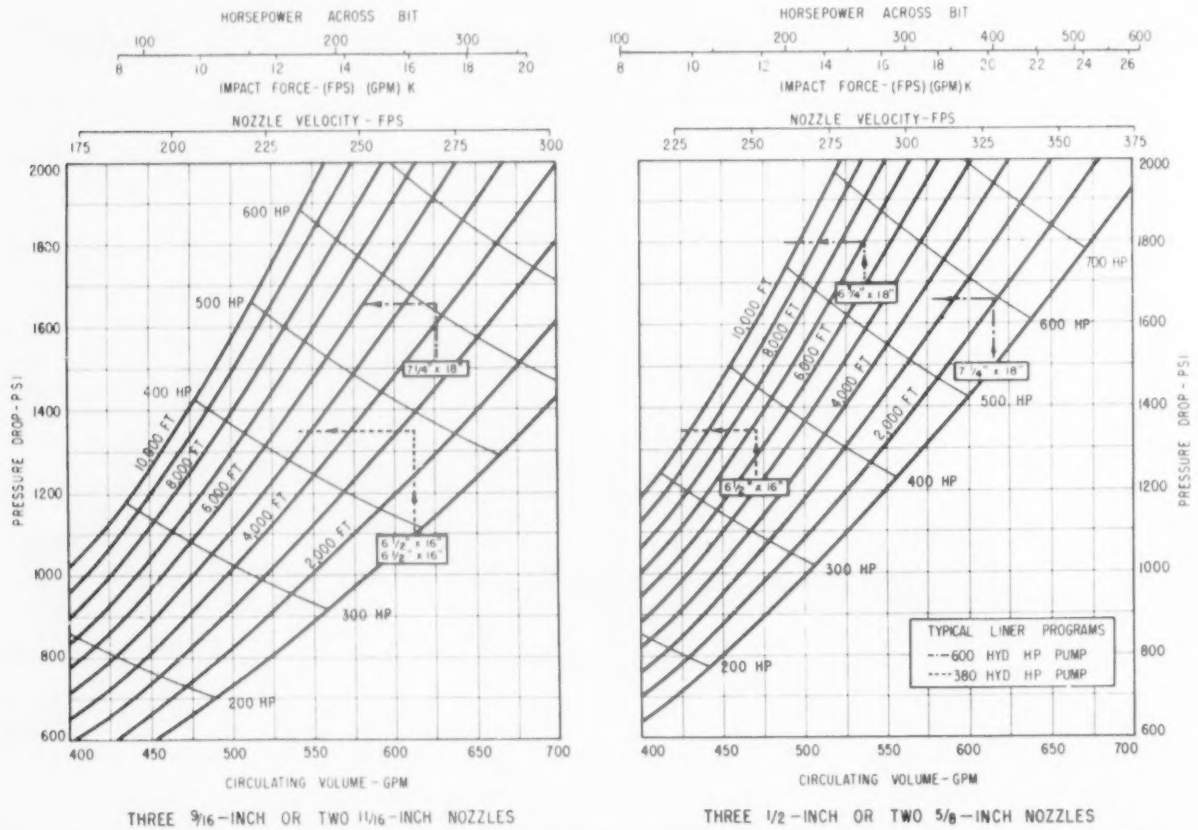


**Fig. 4—Pressure-drop curves for rig using 4½-in. o.d., 16.6-lb. drill pipe. (10.3 lb./gal. or 77 lb./cu. ft. mud and 0.9 nozzle coefficient).**

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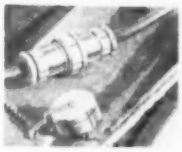

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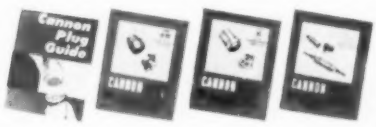


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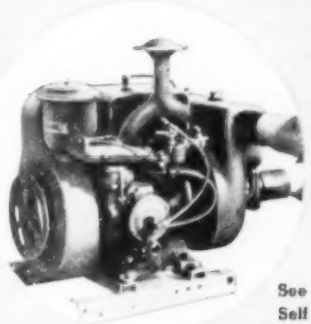

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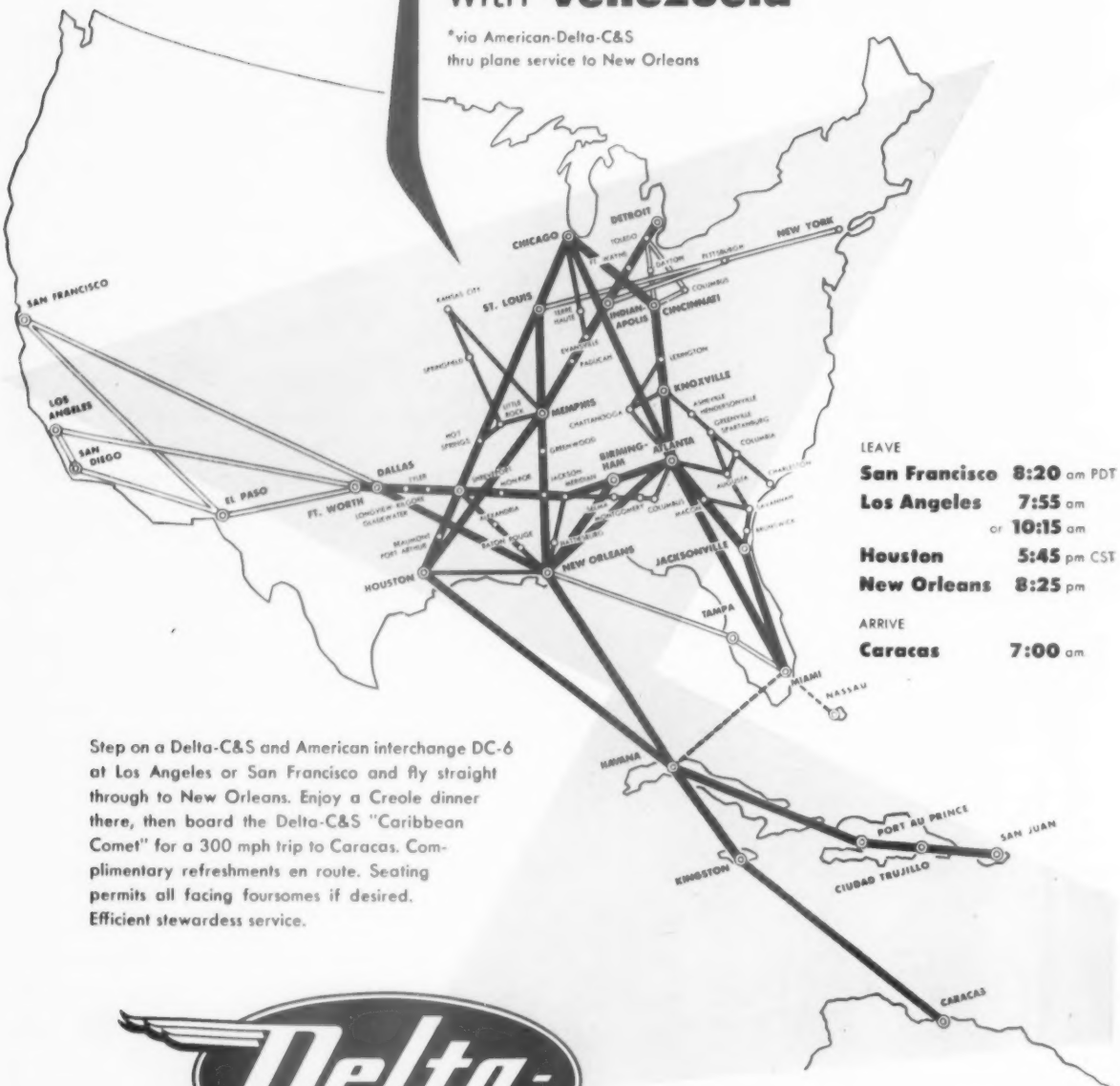


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A majority of pump manufacturers rate a slush pump more or less on the life expectancy of the main bearings. Maximum recommended discharge pressure for each liner size is determined from a nominal input horsepower at maximum speed. Because of this pressure limitation, a reduction in pump speed necessitates a corresponding reduction in output horsepower. Although these specifications have been established to eliminate excessive load reversals in the power end, and, consequently, prevent a decrease in the life expectancy, some operators have economically justified a 10 to 25 per cent overload of pressure or horsepower for short periods of time in lieu of a major investment for larger pumps. In all cases, however, the pump manufacturers should be consulted to ascertain the feasibility of such practices.

A study of alternate hydraulic programs may determine a satisfactory revision of conditions without exceeding rated pump capacity and, at the same time, retain a comparable drilling rate. Two hydraulic programs listed in Table 1 for a medium-size rig with a single 500-nominal-input or 375-output-horsepower pump illustrate a method for avoiding overloaded power pumps. The reduction in liner and nozzle size, combined with a decrease in hole diameter, established a comparable drilling rate and annular mud-return velocity without overloading the rated capacity of the pump by 28 per cent.

### Performance of Jet-Type Rock Bits in California

Partially by a trial-and-error method, the operators and bit manufacturers combined their experience during 1951 and 1952 to solve most of the questions regarding the techniques of jet drilling. The frequent equipment failures initially associated with this new procedure emphasized the necessity for additional engineering know-how and job planning. The greatest density of tests in California to determine the effect on the various factors affecting jet-bit performance has been centered around Castaic Junction and Ventura operations.

A comparison of 9⅞-in. jet and conventional bit data for an extra-heavy power rig in Castaic Junction field is shown in Fig. 5. Well A, offsetting the two jet-drilled wells, was the fastest conventionally drilled well in the field by this rig. Since near-maximum cleaning action by conventional water courses was assured by parallel pump operations, this well provides excellent comparable data. A detailed comparison of bit data for Wells A and B indicates that a 225-ft. per second jet velocity, created by three 5/8-in. nozzles, was necessary on Well B to effect an increase in penetration rate or footage per bit; this minimum velocity occurred at about 5,000 ft. Well C, drilled with 20,000 to 25,000-lb. bit weights and 100 to 150 r.p.m. rotary speeds, successfully utilized three 7/8-in. and three ½-in. nozzles to maintain the average nozzle velocity above 250 ft. per second and, in turn, extended the economical limit of jet bits to 8,000 ft.

**TABLE 1—COMPARATIVE HYDRAULIC PROGRAMS AT 5,000-FT. DEPTH**

| | Actual conditions | Alternate conditions |
|---|---|---|
| Hydraulic data: | | |
| Hole size | 10⅝-in. | 9⅞-in. |
| Drill pipe | 4½-in. I.F. | 4½-in. I.F. |
| Drill collars | 7¾ in. by 250 ft. | 7¾ in. by 250 ft. |
| Liner size | 7½ in. by 16 in. | 6¾ in. by 16 in. |
| Maximum rated pressure | 970 psi. | 1,225 psi. |
| Circulating rate | 585 g.p.m. (56 s.p.m.) | 475 g.p.m. (58 s.p.m.) |
| Annular velocity | 160 ft. per minute | 150 ft. per minute |
| Nozzle size | Three 5/8-in. | Three ½-in. |
| Nozzle velocity | 204 ft. per second | 258 ft. per second |
| Pressure losses: | | |
| Surface piping | 70 psi. | 40 psi. |
| Drill pipe | 585 psi. | 375 psi. |
| Drill collars | 135 psi. | 95 psi. |
| Bit nozzles | 425 psi. | 675 psi. |
| Annulus | 30 psi. | 45 psi. |
| Total | 1,245 psi. | 1,230 psi. |
| Horsepower at pump | 425 | 340 |
| Horsepower across bit | 145 | 187 |
| Impact, (ft. per second) (g.p.m.) K | 11.9 | 12.3 |
| Relative drilling rate | 29 | 29 |

### Other A.P.I. Articles on This Subject

"The Relation of Nozzle Fluid Velocity to Rate of Penetration with Drag-Type Rotary Bits," by J. P. Nolley, G. E. Cannon, and Douglas Ragland, Humble Oil & Refining Co., The Oil and Gas Journal, May 6, 1948 p. 87.

"An Analysis of Hydraulic Factors Affecting the Rate of Penetration of Drag-Type Rotary Bits," by John R. Eckel and J. P. Nolley, Humble Oil & Refining Co., Southwestern District, A.P.I. meeting, Galveston, March 1949.

"Mud Flow in Drilling Mud," by R. J. S. Pigott, The Oil and Gas Journal, May 22, 1941, p. 62.

"Nozzle Design and Its Effect on Drilling Rate and Pump Operations," by John R. Eckel and W. J. Bielstein, Humble Oil & Refining Co., Southwestern District, A.P.I., Beaumont, March 1951.

"Factors Affecting the Rate of Penetration of Rock Bits," by W. J. Bielstein and George E. Cannon, Humble Oil & Refining Co., The Oil and Gas Journal, March 30, 1950, p. 102.

"How to Use Jet-Nozzled Rock Bits to Get Best Performance and Efficiency," by L. L. Payne and R. H. Nolley, Hughes Tool Co., The Oil and Gas Journal, June 2, 1952, p. 76.

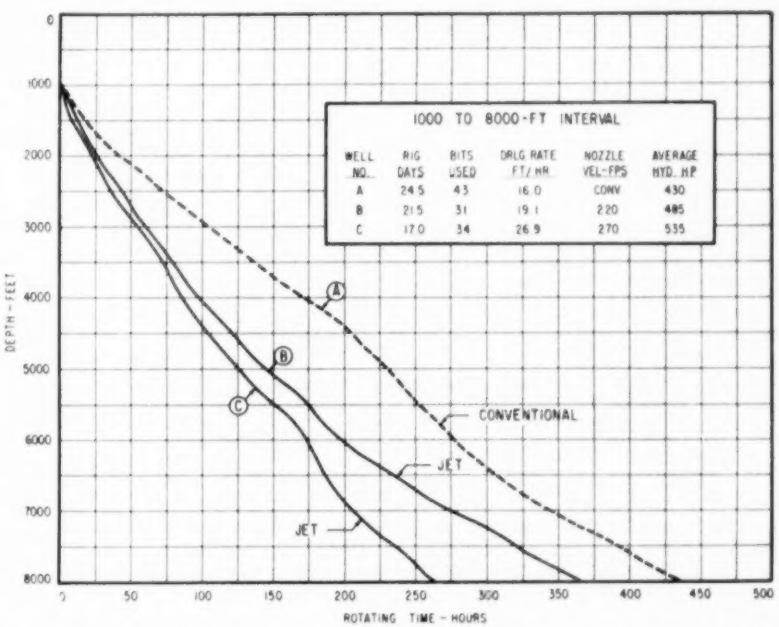


**Fig. 5—Comparison of 9⅞-in. jet and conventional rock-bit drilling at Castaic Junction field.**

## What Are South Dakota's Oil Prospects?

The South Dakota end of the Williston basin contains up to 10,500 ft. of sediments, which thin, primarily by successive pinchouts, to less than 2,500 ft. along the east platform. Upper Ordovician, Silurian, Devonian, Middle, and Upper Mississippian, all pinch out completely before reaching the outcrop. The Winnipeg and Red River sections have produced very encouraging shows, and both are widespread in subsurface. Both have excellent porosity. Silurian-Devonian carbontes underlie at least 7 or 8 counties, but they have been penetrated by too few wells to evaluate their oil possibilities.

The Madison has yielded a few shows in the northwestern part of the state, but has tested fresh water thus far. Too few wells have been drilled to condemn it. The Minnelusa has numerous sandstones which are productive in Wyoming, but in South Dakota they are usually anhydritic, and close to the Black Hills outcrop, they carry fresh water. In spite of the dearth of shows away from the Black Hills, the Minnelusa should be watched very carefully for lithologic changes which might make it an oil reservoir.

Jurassic sands in the southern part of the state, and a Piper limestone facies farther north, may both be potential reservoirs. Cretaceous sandstones offer three possibilities within South Dakota as follows: (1) Newcastle or Muddy production on the east flank of the Black Hills uplift, similar to that on the Wyoming side; (2) traps in tongues of true Dakota sandstone which pinch out to the west into the Graneros shale west of the axis of the Lemmon Syncline; and (3) or gas in either pinchouts or structures developed in the extreme northwest corner of the state, either in the unusually thick Muddy sandstone development, or in the Groat (Eagle) sandstone.

**Fig. 1—Isopach map of total thickness of sedimentary section in South Dakota. East of the dotted line, Cretaceous sediments rest directly on pre-Cambrian basement. Pre-Cambrian outcrops are shown in black.**

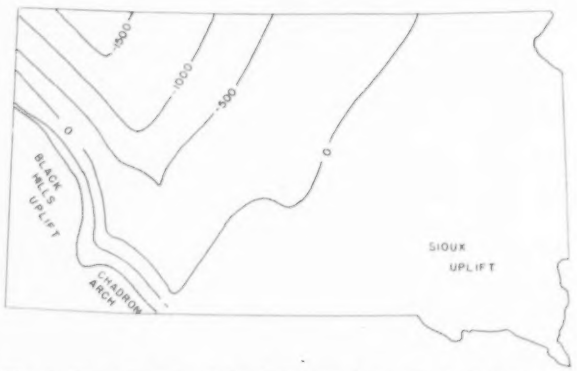


**Fig. 2—Structure map of South Dakota drawn on the Fall River or Dakota (?) sandstone. Previous maps have been drawn on this datum on the west side of the basin and on the true Dakota, which is 430 ft. higher, on the east side.**

# South Dakota Steps Up Exploration

### Wildcat drilling is on the increase with principal interest in the Williston basin portion of the state

**by John Paul Gries**

EXPLORATION in South Dakota has been given great impetus by discovery of commercial oil in North Dakota in 1951. At tax hearings at Bismarck, N. D., in 1952, it was estimated that total oil company expenditures for exploration in South Dakota totaled $3,530,000 in 1950, $7,250,000 in 1951, and an estimated $8,300,000 in 1952.

To make a similar comparison of the increased tempo of exploration, there were seven oil tests started in South Dakota in 1951, 17 started in 1952 and 11 are either drilling or have announced locations so far in 1953 (see Table 1). Actual drilling totaled about 23,000 ft. in 1950, 25,000 ft. in 1951, and 52,000 ft. in 1952. Approximately 22,000 ft. of exploratory drilling has been done in the first 6 months of 1953.

#### Recent Drilling

**Near Black Hills . . .** Drilling close to the Black Hills uplift has gone on intermittently since 1904. Several definite foothills structures are known and depths are moderate, but the geologic section is incomplete (see Table 2). Each of the known structures has from one to five holes upon it. Although many small shows have been reported, only one structure has actually produced oil within South Dakota.

In December 1952, Kucera 2 Barker test in Custer County made headlines when a small quantity of 31° gravity oil was bailed from a middle Minnelusa (Pennsylvanian) standstone at a depth of 1,377 ft. A similar show was encountered on the same structure in 1929. The prospect area, known as the Barker dome, lies on the southwest side of the Black Hills, and may be considered to lie very high upon the east flank of the Powder River basin. This well was not completed, and was

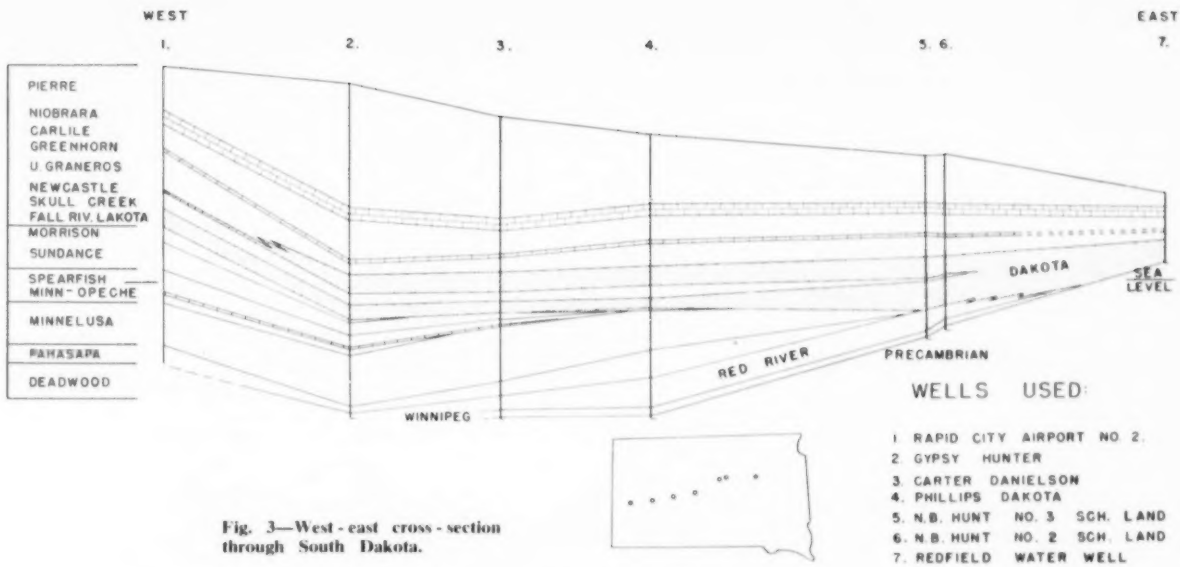


**Fig. 3—West - east cross - section through South Dakota.**

subsequently completed dry in the lower part of the Minnelusa formation at 1,504 ft. The operator has skidded 1,000 ft. to the east, and is now drilling another test. No significant shows have been encountered in foothills structures on the Williston basin side of the Black Hills.

Since 1950, a dozen or more tests have been put down on the east flank of the Black Hills, in search of stratigraphic traps in Cretaceous sandstones. Similar traps on the west side of the Hills produce oil at Osage, Mush Creek, Skull Creek, and Clareton. Only one of the tests on the east side has reported good staining from the Newcastle sandstone.

**Deeper in basin . . .** Shell Oil Co. drilled three seismograph prospects in Perkins and Corson counties in 1951-52. No commercial shows were encountered, but the tests showed that the productive formations of North Dakota and eastern Montana extend into the South Dakota part of the Williston basin. Besides cutting a Silurian-Devonian section, attractive sections of middle and upper Ordovician, middle and upper Mississippian and Pennsylvanian sections were encountered. Each

**THE AUTHOR**

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**TABLE 1—SOUTH DAKOTA OIL TESTS, 1951-53**

| | County, well, and location— | Surface | Bottom | T.D. | Remarks |
|---|---|---|---|---|---|
| 1. | Bennett, H. O. English 1 Kocer, 30-37n-36e | Arikaree | Morrison (?) | 3,370 | Drilled 1952 |
| 2. | Bon Homme, Bon-Oil 1 Jelsme, 10-93n-60w | Pierre sh | Pre-Cambrian | 943 | Drilled 1952 |
| 3. | Bone Homme, Bon-Oil 1 Isaac & Byrne, 8-93n-59w | Pierre sh | Pre-Cambrian | 923 | Drilled 1952 |
| 4. | Brown, Oil Hunters 1 Raetzman, 33-125n-65w | Pierre | Pre-Cambrian | 1,522 | Drilled 1952 |
| 5. | Butte, R. P. Harmon 1 Olson, 27-9n-3e | Graneros | Deadwood | 4,016 | Drilled 1951-52 |
| 6. | Corson, Shell 1 Winter, 11-22n-19e | Hell Creek | Pre-Cambrian | 8,445 | Drilled 1951-52 |
| 7. | Custer, Kucera 2 Barker, 34-6s-2e | Sundance | Minnelusa | 1,504 | Drilled 1952-53 |
| 8. | Custer, Kucera 2 Coffing, 34-6s-2e | Sundance | | | Drilling |
| 9. | Dewey, Youngblood & Youngblood 1 Galvin, 25-16n-22e | Fox Hills | Pre-Cambrian | 6,325 | Drilled 1953 |
| 10. | Dewey, Kerr-McGee 1 Cook, 32-13n-19e | Pierre | | | Drilling |
| 11. | Fall River, Lakota 1 Houghton, 34-9s-5e | Graneros | Minnelusa | 2,528 | Drilled 1951 |
| 12. | Fall River, York & Newell 1 Landers, 3-10s-5e | Graneros | Dakota | 800 | Drilled 1951 |
| 13. | Fall River, Voss 1 Porter, 20-9s-2e | Greenhorn | | | Drilling |
| 14. | Fall River, Weir 1 Houghton, 27-9s-5e | Graneros | | | Suspended |
| 15. | Faulk, N. B. Hunt 1 Gutenbauf, 20-118n-72w | Pierre | Pre-Cambrian | 2,749 | Drilled 1952 |
| 16. | Haakon, Pohle 1 State, 16-4n-18e | Pierre | Pahasapa | 4,743 | Drilled 1951 |
| 17. | Haakon, Carter 1 Danielson, 5-3n-22e | Pierre | Winnipeg | 4,504 | Drilled 1952 |
| 18. | Haakon, Kerr-McGee 1 Schute, 33-3n-19e | Pierre | Pre-Cambrian | 5,486 | Drilled 1953 |
| 19. | Harding, Carter 1 Hendriks, 2-20n-3e | Hell Creek | Ordovician | 8,393 | Lost hole 1953 |
| 20. | Hyde, N. B. Hunt 1 School Land, 24-116n-73w | Pierre | Sundance | 1,940 | Lost hole 1951 |
| 21. | Hyde, N. B. Hunt 2 School Land, 24-116n-73w | Pierre | Pre-Cambrian | 2,594 | Drilled 1952 |
| 22. | Hyde, N. B. Hunt 3 School Land, 31-116n-73w | Pierre | Pre-Cambrian | 2,715 | Drilled 1952 |
| 23. | McPherson, Cabot Carbon Co. 1 Opp, 1-127n-72w | Pierre | | | Location |
| 24. | Meade, Kucera 1 Gingras Bros., 19-3n-7e | Sundance | Minnelusa | 1,280 | Lost hole 1952 |
| 25. | Meade, Kucera 2 Gingras Bros., 19-3n-7e | Sundance | | | Drilling |
| 26. | Pennington, Marigold 1 Dunn, 22-1n-9e | Pierre | Minnelusa | 4,185 | Drilled 1952 |
| 27. | Perkins, Shell 1 Homme, 13-20n-12e | Fort Union | Pre-Cambrian | 9,348 | Drilled 1951 |
| 28. | Perkins, Shell 1 Veal, 7-17n-15e | Lance | Pre-Cambrian | 8,317 | Drilled 1952 |
| 29. | Potter, Dakota-Texas 1 Williams, 27-119n-78w | Pierre | | | Drilling |
| 30. | Shannon, Martin et al. 1 Eucks, 20-36n-41w | Arikaree | Minnelusa (?) | 3,980 | Drilled 1952 |
| 31. | Walworth, Peppers 1 Fee, 36-123n-76w | Pierre | Pre-Cambrian | 3,910 | Drilled 1952 |
| 32. | Walworth, Max Pray 1 Kranzler, 14-121n-77w | Pierre | Pre-Cambrian | 3,808 | Drilled 1952 |
| 33. | Harding, Carter 1-A Hendriks, 2-20n-3e | Hell Creek | | | Drilling |

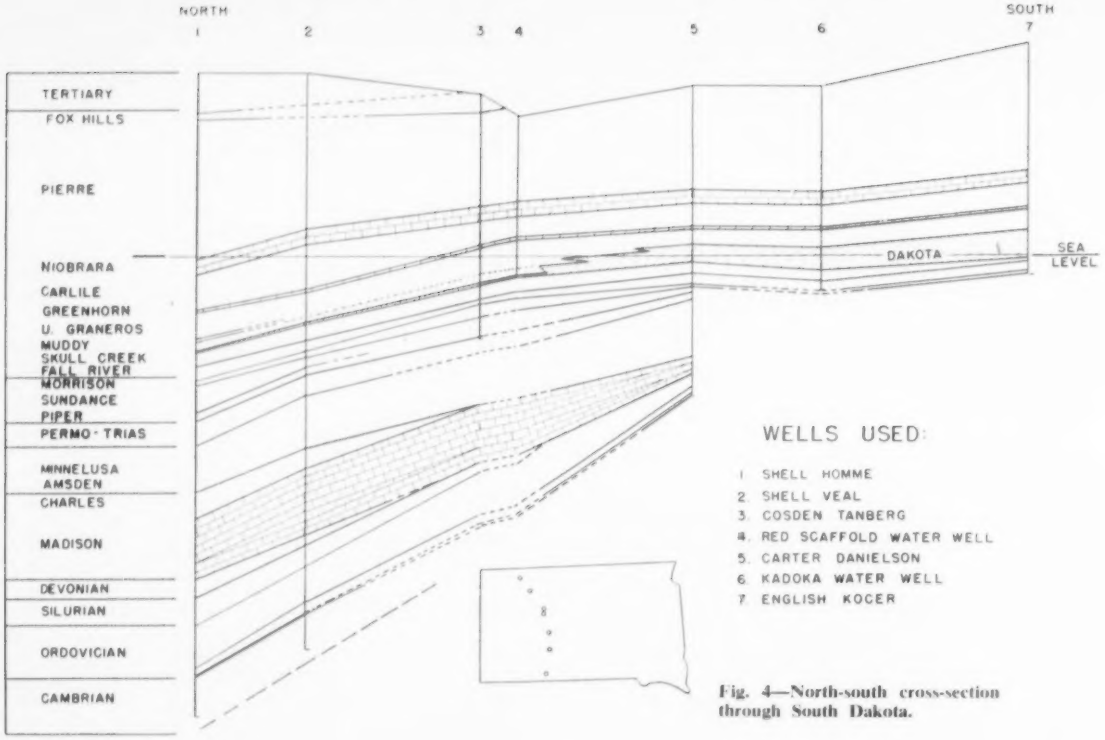


**Fig. 4—North-south cross-section through South Dakota.**

of these formations thins or pinches out to the east and south, offering stratigraphic trap possibilities all around the southern and eastern margins of the basin. The westermost Shell test also indicates that the maximum sedimentary section to be penetrated within the state will approximate 10,500 ft. (See Fig. 1).

The Cedar Creek anticline, which has produced oil from several localities in eastern Montana within the last 2 years, extends for a limited but unknown distance into extreme northwestern South Dakota. Smaller, en echelon folds have previously been tested in Harding County, but Carter Oil Co. 1 Hendriks, now being drilled northwest of Buffalo townsite, is the first attempt to test the Cedar Creek trend in South Dakota. This test has encountered favorable shows in the Red River dolomite, and released tops indicate a section very similar to that in the Little Beaver area 32 miles to the northwest. This area deserves further testing regardless of the outcome of the current Carter test.

**South and east in the basin . . .** In the eastern one-third of the state, Cretaceous sediments rest directly upon the pre-Cambrian basement (Figs. 1 and 3). The 4,850 ft. or more of pre-Cretaceous sediments present in the northwest corner of the state have pinched out in irreguar fashion. (Figs. 3 and 4). The central part of the state, then, offers numerous pinchout possibilities. Efforts to delineate some of these pinchout lines in Potter and Stanley counties were made by the Carter Oil Co. in 1940 and by the Phillips Petroleum Co. in 1944-45.

About a dozen recent tests fall into this same category. Most of them have been drilled on geophysical structures, hoping for either structural or stratigraphic traps. Much useful stratigraphic information has been obtained, but no encouraging oil or gas shows have been reported.

The structural terrace in East-Central South Dakota is similar to that in Bottineau County, North Dakota, where small Madison production has recently been obtained. The North Dakota activity has stimulated new interest in the platform area of eastern South Dakota.

### Structure

The general structure of South Dakota is illustrated by Fig. 2. The synclinal structure, which is the south end of the Williston basin, is locally called the Lemmon syncline. This structural map, drawn on the Fall River sandstone, shows that the basin is fairly steep on the west side, and rises to form a platform area on the east side. Previously published maps have used the true Upper Cretaceous Dakota sandstone as a datum on the southeast edge of the basin, and the lower Cretaceous Fall River or Dakota(?) sandstone as a datum throughout the rest of the basin. This map, then, is structurally about 430 ft. lower on the east

TABLE 2 — PRE-CRETACEOUS STRATIGRAPHY OF SOUTH DAKOTA

| Geologic Period | Black Hills Outcrop and subsurface | Northwest corner subsurface | Eastern Platform subsurface |
|---|---|---|---|
| JURASSIC | Morrison | Morrison | Morrison |
| | Sundance | Rierdon<br>Piper | |
| | Gypsum Spring | Gypsum Spring | |
| | Nuggett | | |
| PERMO-TRIASSIC | Spearfish | Spearfish | |
| | Minnekahta | Minnekahta | |
| | Opeche | Opeche | |
| PENNSYLVANIAN | Minnelusa | Minnelusa-Amsden | Minnelusa |
| MISSISSIPPIAN | | Big Snowy | |
| | | Charles | |
| | Pahasapa | Mission Canyon<br>Lodgepole | Pahasapa |
| | Englewood | Englewood | |
| DEVONIAN | | Devonian, undiff. | |
| SILURIAN | | Silurian, undiff. | |
| ORDOVICIAN | | Stony Mountain | |
| | Whitewood | Red River | Red River |
| | Winnipeg | Winnipeg | Winnipeg |
| CAMBRIAN | Deadwood | Deadwood | |

side than previously so-called Dakota structure maps. This drops the east side, and emphasizes the terrace.

As noted above, the Cedar Creek or Baker-Glendive anticline extends for a short distance into northwestern South Dakota. No structures comparable to the Nesson anticline are known in the South Dakota part of the basin. Some broad, gentle arches are suggested by the geologic map of the state, but no closures are known on these trends.

Several oil tests have been drilled on well-substantiated surface highs, but with only one well to the prospect, there is no indication as to the persistence of these structures with depth. Most of the recent tests have been drilled on seismograph highs, but again drilling has done nothing to confirm the structural interpretation.

**Magnetic structures . . .** Surface magnetometer work, done by State Geological Survey between 1939 and 1946, is compiled on a magnetometer map issued by the Survey in 1950. There has been much speculation as to the cause of several very sharp magnetic highs. One anomaly in Stanley County lies above a known pre-Cambrian ridge. However, three Phillips tests, drilled on the flanks of this anomaly, show a negative correlation between high gravity and high pre-Cambrian surface. The two wells lowest on the magnetic picture encountered pre-Cambrian rock at a much shallower depth than did the well nearest to the crest of the magnetic high. It may be significant that the two flank wells encountered Sioux quartzite, whereas the deeper well, nearer the crest of the anomaly, encountered granite.

The N. B. Hunt 2 State School and Indemnity Land test in Hyde County, was drilled directly on a strong magnetic anomaly in 1952. This test encountered basic igneous rock in the pre-Cambrian at a depth of 2,555 ft. Similar basic rock is known in the Black Hills and Minnesota outcrops, and on the Cedar Creek structure, but has not heretofore been encountered in the basin.

A well drilled 5 miles west, lower on the same anomaly, encountered granite at 2,705 ft. A third test, on the flank of a smaller magnetic high in Faulk County, also struck granite at 2,745 ft. In this area the dip of the pre-Cambrian seems to be fairly uniform into the basin.

In light of the present evidence, it appears that sharp magnetic highs in the Williston basin are not due to highs on the pre-Cambrian surface, either structural or topographic. They are probably due to small areas of basic rock, whose magnetic susceptibilities are much higher than that of the quartzite or granite which are the basement rocks most commonly encountered within the basin.

### Stratigraphic Summary

**Cambrian . . .** The Deadwood formation is present under the northwest third of South Dakota. It reaches a known maximum of 600 ft. in subsurface, as against a maximum of 463 ft. in the type locality in the northern Black Hills. It consists of glauconitic green shales, dolomites and sandstones, and is entirely upper Cambrian in age. Prior to 1936 the Winnipeg group was not recognized in this area, and the Winnipeg sandstone and shale were included in the early measured sections of the Deadwood formation.

**Ordovician . . .** The Winnipeg and Red River beds are essentially coextensive, because the carbonates protected the underlying green shales from post-Ordovician erosion. The Winnipeg normally consists of a lower sandstone, a middle green shale, and an upper standstone or siltstone. Either sand member may be missing locally. The total Winnipeg interval is remarkably uniform, averaging about 140 ft. The lower sandstone, which becomes coarser to the east, has been considered a potential pay zone since saturation was encoun-


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tered in the old States Royalty Petroleum test in Harding County in 1940. This show was originally reported as coming from the Deadwood formation.

The Red River limestone and dolomite is present under roughly the northwest half of the state. The lower 80 ft., present in outcrops in the northern Black Hills, is called the Whitewood. It is normally a coarsely crystalline dolomite, with excellent intergranular porosity. Recently developed production along the Cedar Creek anticline in Montana, and the good shows recently encountered in the Carter 1 Hendriks test in Harding County, make the Red River appear to be one of the most promising potential reservoirs in the state.

The Stony Mountain has a much smaller distribution, in the deeper part of the basin. It consists of a maximum of 200 ft. of somewhat argillaceous dolomite, and is more easily recognized on electric logs than it is in cuttings.

**Silurian-Devonian . . .** Too few wells have penetrated these beds within South Dakota to permit detailed subdivision. Probably a maximum of 650 ft. of combined Silurian and Devonian will be found, and that seems to be limited to six or seven counties in the northwestern part of the state. No shows have been reported to the writer's knowledge.

**Mississippian . . .** Only Englewood and Pahasapa (Madison) crop out in the Black Hills uplift. These have a maximum combined thickness of about 650 ft. on the outcrop and about 850 ft. in subsurface along the northwestern boundary of the state.

On the outcrop, the Englewood is a pink argillaceous limestone, with or without an underlying red or gray shale section. The red color disappears to the north in subsurface, and the correlation between the Englewood of the outcrop and the Englewood as used in subsurface within the Williston basin is not clear. The outcrop Englewood may be somewhat younger than the Englewood of subsurface, probably the equivalent of part of the Lodgepole of subsurface. Mission Canyon and Lodgepole are recognized in subsurface, but are not separated on the Black Hills outcrop. Shows have been reported in the Mission Canyon in the northwestern part of the state, but the formation almost invariably tests fresh water. Several holes have been lost in this section, due to heavy artesian flow and attendant difficulties with lost circulation.

The lower Charles anhydrite extends down into the northwestern counties of South Dakota, and a maximum of about 400 ft. of Charles is probably present. No shows have been reported.

The Big Snowy group has only limited distribution in the northwest part of South Dakota. Variegated shales assigned to the Big Snowy group around the southern margin of the basin may as well be correlated with the variegated shale and "junk" section normally present at the base of the Pennsylvanian.

**Pennsylvanian . . .** Recent drilling has not solved the relationship between the Minnelusa of the Black Hills area and the Amsden of the North Dakota part of the Williston basin. It seems more likely that the two represent different phases of one continuous period of deposition. The distribution of the Minnelusa is much different than that of any of the underlying formations. It reaches a maximum thickness of 1,300 ft. in the southwestern corner of the state and thins to 600 ft. of Minnelusa-Amsden in the northwestern part of South Dakota. It is missing at least partly by truncation in the eastern half of the state.

Although numerous small shows have been reported from the Minnelusa close to the hills, no shows worth testing have been encountered in the basin proper.

**Permo-Triassic . . .** The Opeche shale, Minnekahta limestone, and Spearfish shale make up the red-bed sequence in western South Dakota. From a thickness of 600 ft. along the west edge of the state, the series thins eastward, and is gone before the Missouri River is reached (see Fig. 3). Most of the thinning takes place in the Spearfish, probably by pre-Jurassic erosion. In Haakon County, the Minnekahta seems to rest directly on the top of the Minnelusa, although normally the Opeche interval remains fairly constant at 110 to 130 ft.

**Jurassic . . .** Around the Black Hills, on outcrop and in subsurface, Nugget, Gypsum Springs, Sundance, Unkpapa, and Morrison are recognized, with a maximum thickness southeast of the Hills of 900 ft. Only the Sundance and Morrison are persistent to the east. In the northwest counties, a typical basin sequence of Gypsum Springs, Piper, and Rierdon is recognized. The Sundance is recognized only in the western third of the state; glauconitic gray shales previously identified as Sundance in the central part of the state are now correlated as Skull Creek, and lie between the true or eastern Dakota, and the Lower Cretaceous Fall River sandstone.

Oil and gas shows have been reported from some of the Sundance sands close to the Black Hills, but none

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are known from the Williston basin. The Sundance should not be condemned as a possible oil reservoir in the basin, even though no encouraging shows have yet been reported.

The Morrison is primarily a shale in this area, with some thin sands near the Black Hills. Except for a small quantity of oil recovered in a cable tool test near Ardmore, Fall River County, several years ago, no shows have been reported from the Morrison in South Dakota.

**Cretaceous . . .** The Cretaceous forms the bedrock over three-fourths of South Dakota, even though east of the Missouri River it is concealed by glacial drift. Its greatest thickness is in the northwestern corner of the state, where up to 3,850 ft. have been penetrated.

The basal Cretaceous sands, which are of Lower Cretaceous age around the Black Hills uplift, and in much of the Williston basin, build up in the section along the southeast platform, so that the top of the sand section is Upper Cretaceous age in that area. The sands intertongue with the gray marine shale section to the west. The highest sandstone tongue from the east is that found at the original type locality for the Dakota in northeastern Nebraska and adjacent South Dakota. (See Fig. 3.) In the central part of the the state, the upper or true Dakota sandstone lies 430 ft. higher stratigraphically than the Fall River or Dakota (?) sandstone of the Rocky Mountain area. Structure maps have normally been drawn on the true Dakota along the eastern platform, and on the Fall River sandstone in the basin and to the west.

On the southwest side of the basin, sandstone is less prominent in the section. Besides the basal Lakota-Fuson-Dakota group, and separated from it by the Skull Creek shale, is the Newcastle or Muddy sandstone horizon. The Newcastle is roughly the time equivalent of the base of the true Dakota sandstone in subsurface to the east. In fact, much of the "Muddy" or "Newcastle" sandstone in south central South Dakota was probably derived from the south and east, and most of it lies slightly higher than the true Newcastle.

The next sandstone in the Cretaceous section in western South Dakota is the Groat, which appears as a thin, irregularly distributed sandstone tongue in the Pierre shale section. It is apparently the farthest east extension of the Eagle sandstone of Montana. Although a sand in this position carries gas along the Cedar Creek structure, only small shows have been reported from northwestern South Dakota. The Fox Hills sandstone, which represents a final retreat of the Cretaceous sea,


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occurs in the northwest part of the state, but is not known to carry oil or gas.

**Continental late Cretaceous and Tertiary beds . . .** Up to 600 ft. of lignitic clays and sandstone of Hell Creek and Fort Union age cover much of the northwestern corner of South Dakota. In the south central part, Oligocene, and Miocene beds form the surface in the Badlands and Pine Ridge areas. Small scattered patches of Pliocene and Pleistocene are known.

# BOOKS

TODAY'S CHALLENGE TO THE ADMINISTRATOR. By Joseph D. Stockton. Published by Research Division, California Personnel Management Association, 2180 Milvia Street, Berkeley, Calif. $1.

This is a stenographic brief of an address before the association publishing the pamphlet, which had to do with that aspect of the administrator's job which concerns the leadership of people. It treats on how to motivate subordinate managers and through them the general employe body with the objective of raising the level of productivity.

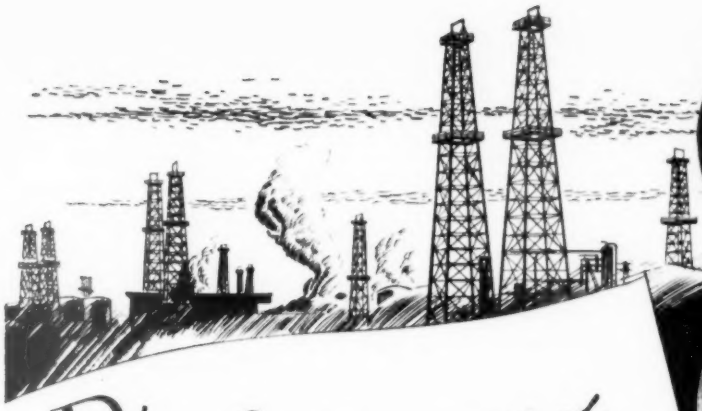
SYMPOSIUM ON FATIGUE WITH EMPHASIS ON STATISTICAL APPROACH II. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 96 pp. $2.

This booklet contains four papers which were presented during the fiftieth anniversary meeting of the society held in New York last year. The symposium represents a continuation of the subject on statistical aspects of fatigue, Part I having been presented in March 1952.

ASTM—IP PETROLEUM MEASUREMENT TABLES. American Edition. United States Units of Measurements. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. American Edition, $8.75 (544 pp.); British Edition, $7.00 (432 pp.); Metric Edition, $7.70.

This material, prepared jointly by the A.S.T.M. and the Institute of Petroleum, Great Britain, consists of a comprehensive group of tables, standardized on an international basis for the calculation of the quantities of crude petroleum and petroleum products in any of three widely used systems of measurement. These 39 tables have been developed specifically to meet the needs of all those concerned with purchase, sale, consumption, and handling of petroleum and petroleum products. They include data for all conversions given in the six tables of National Bureau of Standards Circular C 410 and cover additional useful ranges of temperature and gravity. Furthermore, many additional tables are provided to facilitate weight and volume conversions where more than one system of measurement is involved. Tables are provided over normal operating ranges for the reduction of gravity and volume to standard temperature, for calculation of weight-volume relationship, and interconversion of a wide variety of commercially useful units. These tables are expected to apply to crude petroleum regardless of source and to all finished petroleum products derived therefrom regardless of method of manufacture.

REPORT ON SURFACE PREPARATION OF STEELS FOR ORGANIC AND OTHER PROTECTIVE COATINGS. Published by



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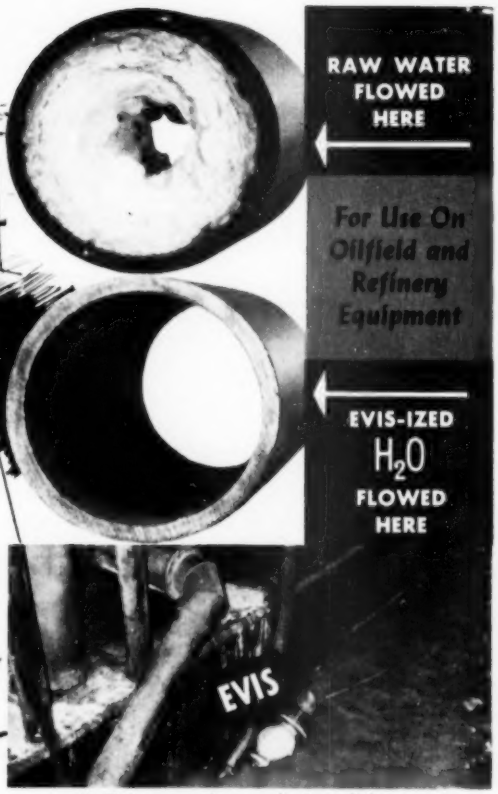
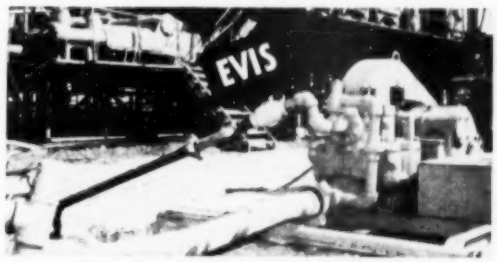



*4" Evis on main supply for offshore drilling barge in Louisiana.*

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This is the second interim report of Technical Practices Subcommittee 6-G of the N.A.C.E. dealing with methods of preparing steel surfaces for coatings. It covers recommendations and explains methods whereby the surfaces of steel may be prepared for painting with organic and other coatings by means of weathering, wire brushing, grinding, flame conditioning, nozzle-blast cleaning, etc.

THE INERT-GAS-SHIELDED METAL-ARC WELDING PROCESS. By W. H. Wooding. Published by American Welding Society, 33 West Thirty-Ninth Street, New York, as a reprint of an article published in the Welding Journal. 30 pp. $1.

This educational pamphlet covers the subject in such a way as to be informative and instructive to operators, supervisors, and engineers alike. The material was presented as educational lectures at the annual meeting of the American Welding Society.

CONSULTING SERVICES, 1953. Published by Association of Consulting Chemists and Chemical Engineers, Inc., 50 East Forty-First Street, New York. 144 pp.

This is a directory of the members of the publishing association, and it describes each member's qualifications and activities. It also lists unusual laboratory equipment owned by members.

GAS APPLIANCE SERVICE WATER HEATER MANUAL. Published by American Gas Association, 420 Lexington Avenue, New York 17. 248 pp. $2.

This pocket-size volume with metal-ring binders includes information on the selection, installation, adjustment, and servicing of water heaters and their controls. The text has been designed so as to eliminate unnecessary duplication between diagrams and text. The majority of the service information has been placed on the diagrams facilitating the correlation of this information with the control.

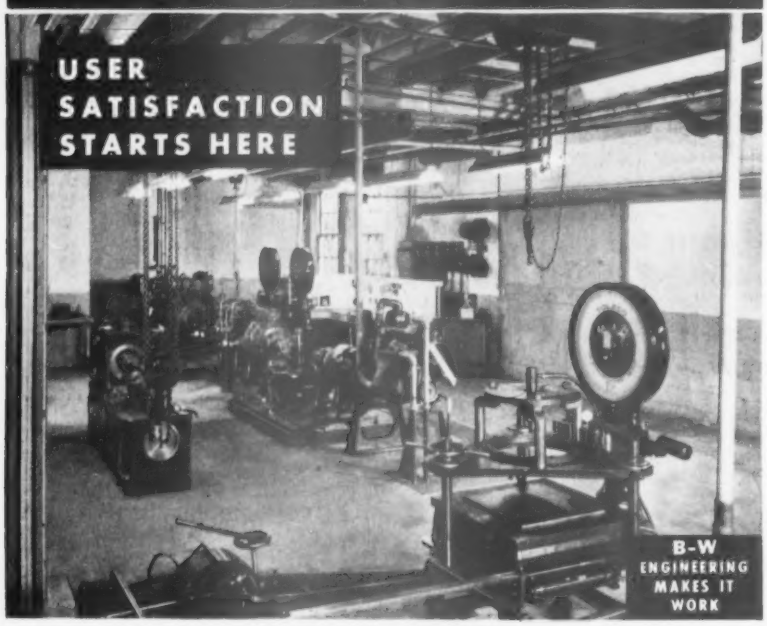
METAL CLEANING BIBLIOGRAPHICAL ABSTRACTS, 1842-1951. Prepared by Jay C. Harris. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 136 pp. $4.25.

These abstracts are intended to make the published data on metal cleaning readily available to the many persons concerned with the production, finishing, and maintenance of metal products. The references are arranged by year, and secondarily by author, or by the journal in which the article appeared if annonymous, and are numbered consecutively.

A STUDY OF ASPHALTS AND ASPHALTIC MATERIALS. By George W. LeMaire. Published by Colorado School of Mines as its Quarterly. 89 pp. $1.50.

This volume covers asphalts from a review of theories concerning the composition and structure of asphalt, to a bibliography.


ROCKFORD CLUTCHES

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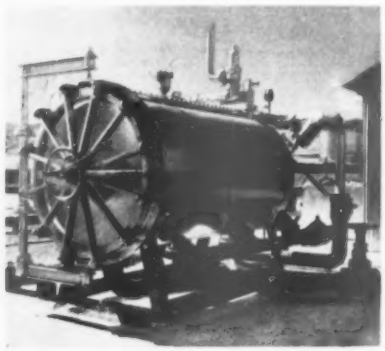
READING FOR PROFIT JOURNAL CHECK CHART

## What Is This Equipment?

THIS setup is found at the South Cuyama salt-water disposal plant of Richfield Oil Corp. However, it would not be out of place in a chemical or petroleum-processing plant.



Can you identify it? Check the answer in one of the squares below, then turn to page 134 to check yourself.

- ☐ Solution settler, used to settle precipitated salt prior to discarding the water.
- ☐ Steam drum for heating samples prior to analysis.
- ☐ Leaf-type pressure filter for removing suspended solids from solution.
- ☐ Oil-water separator, used prior to treating the salt water.
- ☐ Salt-water evaporator used to concentrate the solution before disposal.

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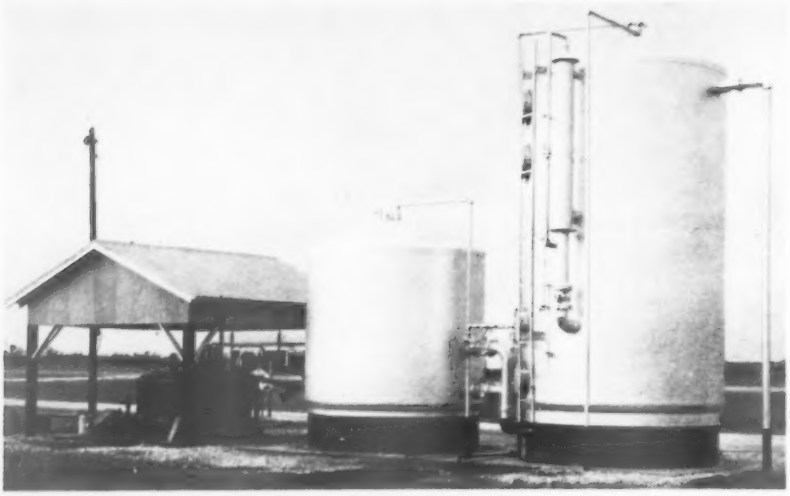
# Surface Equipment for Gulf Coast Salt-Water Disposal

**by C. Malcolm Davis**
**Gulf Coast District Editor**



**CHOCOLATE BAYOU field salt-water-disposal unit of The Texas Co. in Brazoria County, Texas.**

SALT-WATER disposal is a necessary operation in many Gulf Coast fields located variously in Texas, Louisiana, and Mississippi. The preferred practice is to return salt-water production to underground strata, and more and more these days petroleum engineers are designing the salt-water return operation so that the injection is back to flanks of the oil-producing reservoir itself.

Shown here are two of the surface installations and principal equipment of salt-water-disposal operations in Chocolate Bayou and Hastings fields. These surface equipment installations are carefully engineered and are semi to fully automatic in operation. Neat and orderly, they represent utilization of modern equipment and good construction practices.

**Chocolate Bayou . . .** Shown in one photo is The Texas Co.'s salt-water-disposal unit at Chocolate Bayou field, Brazoria County, Texas. The 10 by 17-ft. 6-in. vertical-type accumulator on the right has a throughput of about 5,000 bbl. per day. It provides surge space for salt water coming from the treating plant.

The conditioner and filter tank, 10 by 15 ft., (in the middle) is rated at 5,000 bbl. per day. It contains 162 cu. ft. of filter sand which weighs 15,000 lb. The tanks have a working pressure of 25 psi.

The vertical triplex direct-flow (Aldrich) pump 2 by 3-in., picks up the clean salt water at about 25 psi. and discharges it at 1,000 psi. The pump has a capacity of 129 g.p.m. and is powered by a Model XAHU gas engine. With a sight glass, siphon, and overflow control on the accumulator, the operation is semi-automatic.

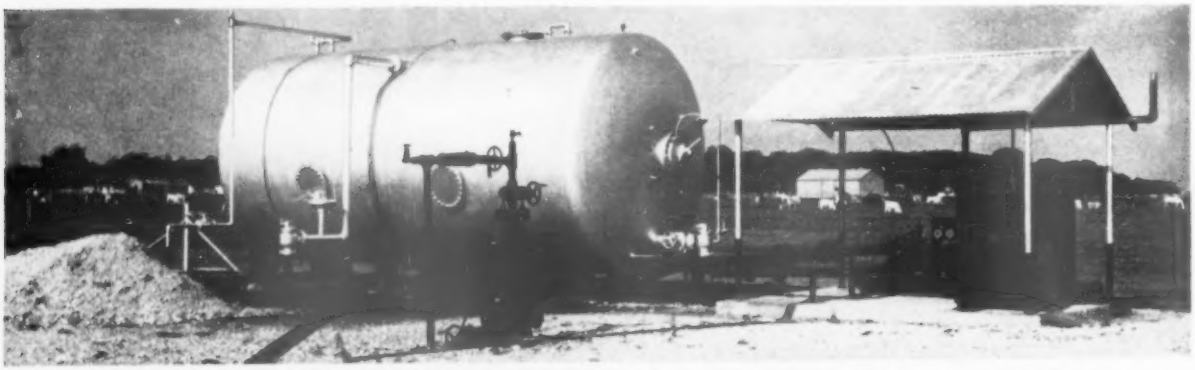
Occasionally the filter is backwashed with clean water to remove the collected sediments.

**Hastings field . . .** One of Stanolind Oil & Gas Co.'s salt-water-disposal units at Hastings field, Galveston and Brazoria counties, Texas, is shown in the other photo. The long horizontal accumulator tank with a capacity of 7,500 bbl. per day provides for surge space for water coming from the treating plant. Further, it permits filtration of any suspended solids in the water. An oil seal at the top of the tank keeps air from contacting with the water.

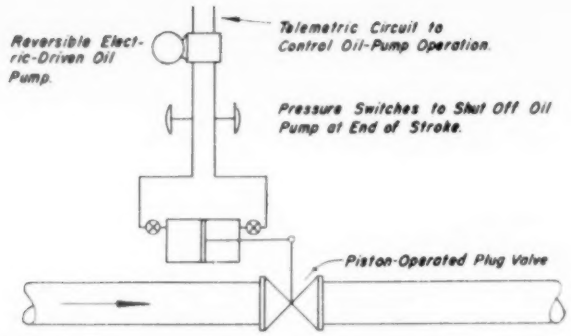
The centrifugal pump under the metal roof injects the salt water into the input well. The pump has a capacity of 5,000 bbl. per day and a discharge pressure of 250 psi.

The gas line going into the top of the well head permits using gas pressure to backflow the injection well whenever the formation wall of the well becomes covered with sediment. Backflowing is done about twice a year at this particular well.

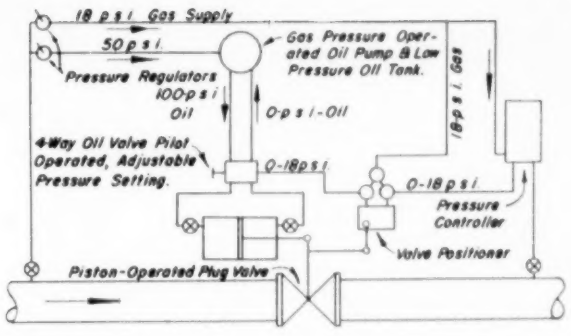
The gas line at the far end of the horizontal accumulator is used to keep the desired pressure on the tank. The oil line in the central part of the tank is used to remove oil at the oil seal whenever that becomes necessary.



**HASTINGS FIELD salt-water-disposal unit of Stanolind Oil & Gas Co. in Galveston and Brazoria counties, Texas.**


Reversible Electric-Driven Oil Pump.
Telemetric Circuit to Control Oil-Pump Operation.
Pressure Switches to Shut Off Oil Pump at End of Stroke.
Piston-Operated Plug Valve

REMOTE MANUAL CONTROL of piston-operated plug valve. Fig. 1.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50 p s i
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Pressure Regulators
100-p s i Oil
0-p s i-Oil
18 p s i Gas
4-Way Oil Valve Pilot Operated, Adjustable Pressure Setting.
0-18 p s i
0-18 p s i
Pressure Controller
Valve Positioner
Piston-Operated Plug Valve

PRESSURE CONTROL with piston-operated plug valve. Fig. 2.

PIPE-LINE POINTERS . . .

# Use of Piston-Operated Pipe-Line Valves

by F. M. Partridge* and G. C. Wilson*

THE use of oil-filled piston-operated valves in pipe-line service for remote control or for automatic pressure or volume control enables very accurate valve positioning. Additional advantages are:

- The oil-filled cylinder greatly reduces required maintenance, particularly on the piston cups.
- Most valves can be converted to remote or automatic control by installing an operating cylinder and positioning equipment without taking the valves out of service.
- In case of oil-system failure, the valve usually remains in its operating position. This is generally preferable to the usual control valve which either closes off or opens wide on control-system failure.
- Complex pressure-limiting stations can be eliminated by putting this type of control equipment on a main-line valve.

*Southern California Gas Co. Portion of paper presented at Pacific Coast Gas Association, gas supply and transmission conference, Santa Barbara, Calif., May 1953.

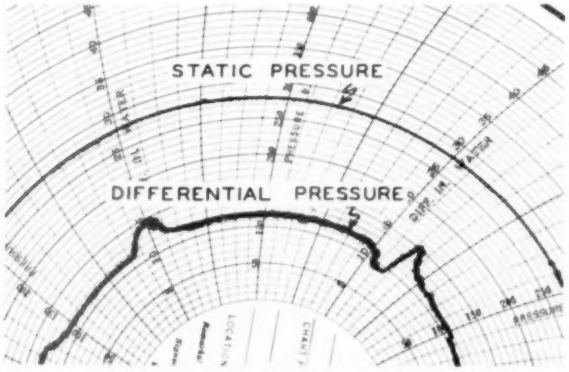
**Remote positioning . . .** There are two different objectives desired in positioning valves for throttling purposes. The first and perhaps simplest is remote valve positioning. In this case the valve is positioned from some remote location at any desired percentage opening in a manner similar to "hand control" or "hand feeding" by a human operator at the valve location. This operation is desirable in the remote control of valves.

When a valve is to be opened between two systems in which there is an appreciable difference in pressure, it is very desirable, if not absolutely necessary, to open the valve very slowly and often to hold the valve in an intermediate position. This could be done with a motor-operated gear driven valve, but the use of a cylinder operator offers the advantages of flexibility of operations and the fact that the cylinder operator can often be installed on existing valves without taking them out of service.

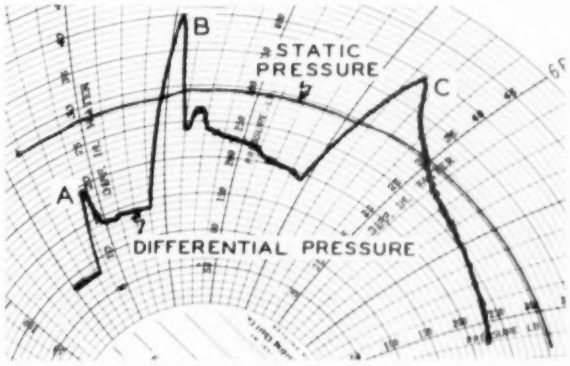
To accomplish this positioning using a piston operated valve, oil is pumped from one side of the piston to the other by means of a small aircraft type electric hydraulic pump. Filling the cylinder with oil eliminates the three main difficulties usually encountered in positioning piston-operated valves which are (1) leakage past the piston cups, (2) high static friction, and (3) the compressibility of the gas in the cylinder. The speed of valve movement can be readily controlled by a variable or fixed restriction in the oil line to the cylinder and the valve can be very accurately positioned as desired.

Sufficient pressure is made available so that when the pump starts operating, the valve immediately moves because of the relative incompressibility of the

(Continued on page 127)




ORIFICE-METER-CHART section, showing flow conditions downstream of experimental plug valve. (96-minute chart rotation.) Fig. 3.




ORIFICE-METER-CHART section showing flow conditions when changes in pressure setting are made. (96-minute chart rotation.) Fig. 4.

# Noisy Compressor Engines Get Mufflers

## *Acoustic filters on air intake reduce roar to whisper*

**by W. N. Lindblad***

ACOUSTIC filters installed on air intakes to reciprocating compressor engines are being used to eliminate a noise problem at the Hinkley compressor station of Pacific Gas and Electric Co. near Barstow, California.

Before installation of the filters, noise level at a point 2,000 ft. from the plant was objectionable. No noise is discernible at this point during operation with the filters

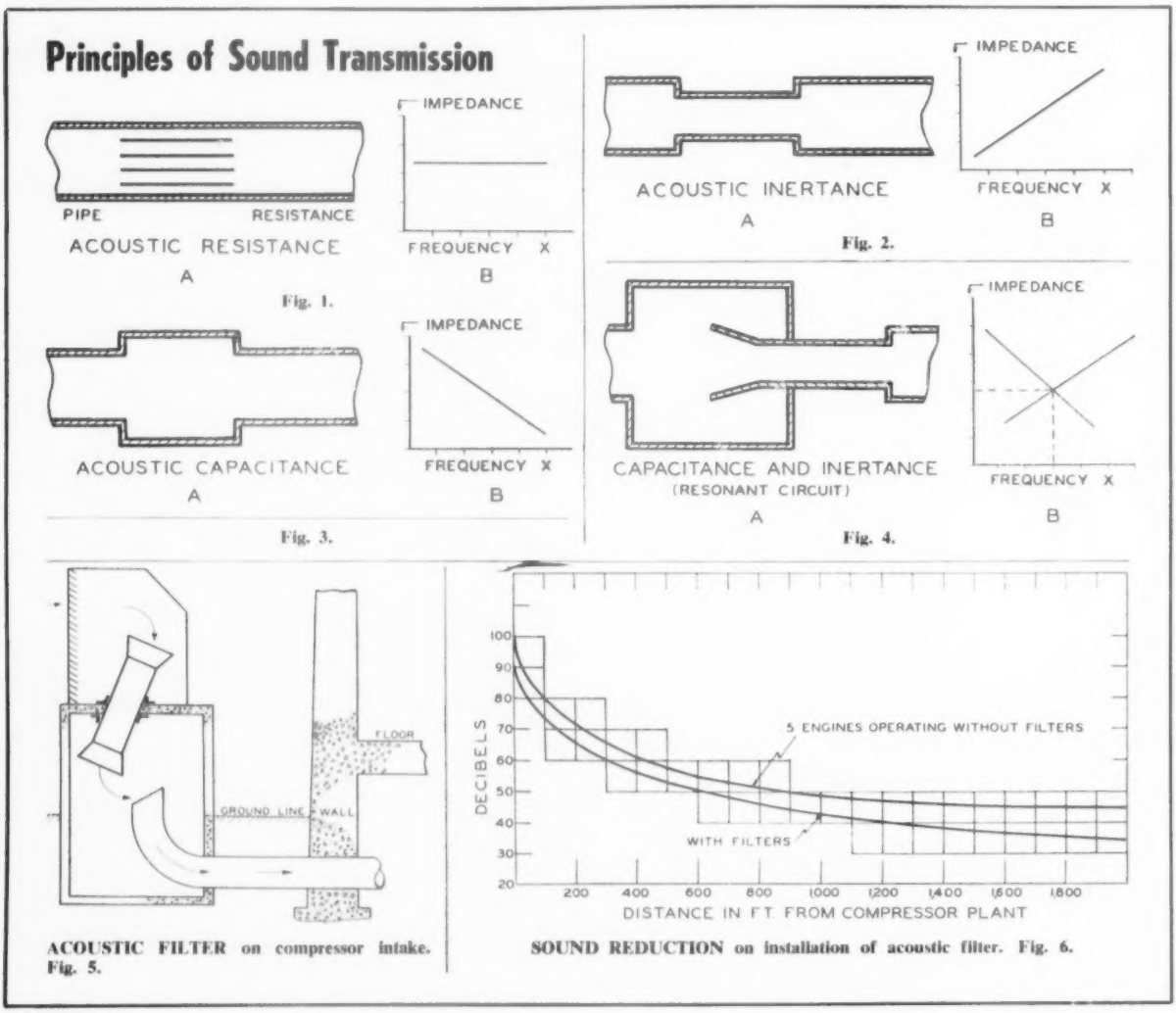
*Pacific Gas and Electric Company. Portion of paper presented at Pacific Coast Gas Association gas supply and transmission conference, Santa Barbara, Calif., May 1953.

**Theory of filter . . .** A sound wave is a variation in air pressure which causes a movement of air molecules back and forth across a plane perpendicular to the direction of propagation of the sound. The propagation is generally in a straight line and at a standard velocity of approximately 1,100 ft. per second. The frequency of vibration determines the pitch of the sound. The magnitude of vibration or alternative movement of air molecules determines the loudness of the sound and is called "volume current."

Sound waves travelling in closed conduits encounter three forms of impedance to travel which may be described as:

**"Resistance"** causes a loss or dissipation of sound energy, the same for all frequencies. It is caused by friction against the side wall or other surface and can be increased by the addition of vanes. See Fig. 1.

**"Inertance"** or "choke" tends to prevent a rapid change in volume current; hence has more impedance to high frequencies. It is accomplished by placing a sudden reduction in the pipe area. See Fig. 2.



**"Capacitance"** tends to enhance or encourage a rapid change in volume current; hence has low impedance to high frequencies and high impedance to low. Acoustic capacitance appears as a sudden enlargement in the pipe area or chamber. See Fig. 3.

If an acoustic inertance and a capacitance are placed in close proximity in a pipe (see Fig. 4) carrying sound waves there will be a certain frequency at which the impedances of both are equal, Fig. 4-B.

In this condition and at this frequency a peculiar physical condition occurs which is called "resonance." An increased activity of the air within and between the two occurs at the resonant frequency which tends to absorb and to attenuate all vibration of that frequency passing through the pipe.

**Design of filter . . .** The air intake to each engine passed through a vertical louvre approximately 7 ft. square in the side wall of an approximately cubical metal box containing oil filter screens which clean the air. Thence it passed down through a 24 in. pipe through an elbow and horizontally into the building under the floor and to the intake manifold of the engine.

The space under the oil filter was available for the insertion of a capacitance chamber and choke tube providing the dimensions were adequate. To determine this a number of choke tubes and capacitances were tested in the laboratory utilizing an oscillator and loud speaker to produce variable frequency sound. Enough information was obtained to indicate that the dimensions were adequate for the desired frequency.

The final arrangement as applied to engine No. 1 is shown in Fig. 5. Choke tubes of 16 in. and 12 in. were made up. A 24 in. pipe extending half way to the oil filter of engine No. 2 was made up to find out whether a manifold connecting all filter chambers would be advantageous.

**Final tests . . .** Comparison tests of engine No. 1 (with filter) and engine No. 2 (without filter) each operating alone showed a very substantial reduction in noise due to the filter. The test also showed that the 16 in. choke tube gave better results than the 12 in. tube and that a manifold would be a further improvement.

Tests were also made to determine what affect the acoustic filter might have on the air flow to the engine. Manometer readings showed a pressure drop of 3 in. of water occasioned by the acoustic filter. This was considered to be of no great consequence.

Construction of filters for all seven engines was begun immediately. The manifolds were left out because of interference with buried piping but will be installed on the filters of three new compressors which are being added to this plant.

A series of noise level measurements were made at various distances from the plant before and after the installation of the filters with the plant in normal operation. These results are shown graphically in Fig. 6.

## Use of Piston-Operated Pipe-Line Valves

*(Continued from page 125)*

oil used. A schematic diagram of the piping arrangement for this method of valve positioning is shown in Fig. 1.

A reservoir must be supplied for excess oil and the amount of valve movement per unit of time determined for the benefit of the operator. An air-powered pump (using gas pressure) could be used for this service but if electric power is required for the telemetric controls, it can be conveniently used for operating a pump.

**Control valve . . .** A slightly more complex setup is required in order to position a piston operated valve for pressure or volume control. A pressure controlling setup is shown in Fig. 2. A conventional pneumatic pressure controller is used, the output of which feeds into an external lever type of valve positioner which is connected to the valve plug through suitable mechanical linkage. The output of the valve positioner then is connected to operate a four-way adjustable pilot valve. This valve has a neutral position so that when the output pressure of the positioner is approximately 8½ psi., the four-way valve is closed and the piston-operated valve is at rest.

The four-way valve controls the output of a simple air-liquid reciprocating pump such as is used for pumping heavy oil in a service station. The pump used had a 2-to-1 pressure ratio so that with a gas pressure supply of 50 psi., the pump is always ready to deliver oil at about 100 psi. to the supply connection of the four-way valve. Any time the four-way valve moves to permit oil to flow into the valve cylinder, the oil pump starts to operate.

The oil pump is mounted on a lightweight vessel in which the oil is stored at atmospheric pressure. The vent or exhaust connection of the four-way valve is connected to this oil reservoir so that exhaust oil from the valve cylinder is returned to storage and reused. Gas at 50 psi. pressure is supplied to operate the reciprocating air-liquid pump and gas at 18 psi. is supplied to the valve positioner and to the pneumatic pressure controller.

The pump used in this experimental work is an inexpensive type which has been used successfully for handling lubricants in automobile service stations. Many high quality pumps are available and perhaps a more expensive model would be justified on some installations.

**Control charts . . .** A section of an orifice meter chart from the meter downstream of the control valve is shown in Fig. 3. This chart was rotated with a 96-minute rotation clock and clearly shows the smooth pressure and differential lines produced.

The static and differential pressure records during pressure setting changes are shown in Fig. 4. The charts are from a 30-in. orifice meter immediately downstream from the test valve which was a 12-in. buried plug valve. The upsets shown on the chart were caused by:

| Point | Change |
|---|---|
| A | Control point raised 5 psi. |
| B | Control point raised 10 psi. |
| C | Control point raised 10 psi. with oil flow restricted to slow down the piston speed. Each time division on the chart is equal to 1 minute. |

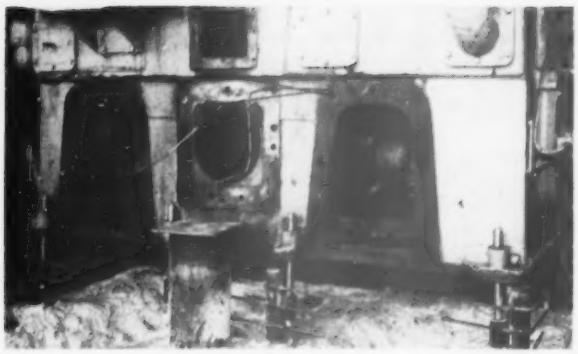
The pressure controller used on this job was arranged so that the set point could be changed from a remote point over a telemetric circuit. The controller is of the "program" type but with a special spiral cam installed in place of the usual "time" cam. This cam is rotated by means of a reversible direct current motor controlled from a remote location by reversing the direction of current flow in the telemetric circuit.

**Wear resistance . . .** Some experience has been obtained to indicate that plug valves are quite resistant to abrasive wear on the body and on the plug when used for control work; however, for operations under severe or questionable conditions, it is recommended that provision be made for periodic inspection of the valve interior. This would in some cases require the installation of upstream and downstream block valves and a bypass in a manner similar to conventional regulator installations.

## BOOK

PIPEFITTERS HANDBOOK. By Forrest R. Lindsey. Published by Industrial Press, 148 Lafayette Street, New York 13. 282 pp. $6.

This book is designed to provide quickly and conveniently the answers to problems involving pipe bending, layout, and installation. It includes fitting dimensions, measurements, angles, conversion factors, spacing of pipe hangers, soldering and brazing, mitering, and a dictionary of piping terms.



Permanent pipe supports make it easy to line up compressor-base holes with foundation bolts.

Closeup shows how extra-heavy pipe is employed as support. Large-size bolts are used to jack compressor vertically.

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## ON THE JOB . . . IN THE PLANTS

# Special Pipe Supports Aid in Regrouting Compressor Foundation

SPECIAL pipe supports permanently set in compressor foundations can be used to advantage when it is necessary to regrout the foundations.

Normal operation of large compressors results in vibrations which eventually cause the foundation bolts to fail. These bolts must be replaced periodically.

Previously it had been necessary to remove the compressor from its foundation when replacing foundation bolts. After the machine was removed, concrete around the bolts was chipped out and new top sections installed on the anchor bolts. The foundation would then be restored to its proper dimensions with new concrete.

After this operation the compressor was moved back into position over the foundation bolts and grouting installed between the base of the machine and the top of the foundation. Since the compressor had been removed for its normal position, it was difficult to insure that the new bolts would line up with the holes in the compressor base when the machine was again placed in position. Very often one or more of the bolts would be out of line and it would be necessary to bend it slightly so that it would go through the hole in the compressor base. This treatment rapidly ruined the bolt, and another regrouting job would become necessary.

The new method of repairing foundations requires the installation of permanent pipe supports adjacent to the foundation bolts. These supports consist of short lengths of heavy-duty pipe, blanked off at the upper end and

set in a vertical position within the foundation of the compressor. Holes are drilled and tapped through the compressor base directly above the pipe supports and large-size bolts, screwed into these holes, are used to jack the compressor in a vertical position without any horizontal movement. This permits chipping out the old foundation and replacement of foundation bolts without moving the compressor from its proper position over the foundation.

This new method insures perfect alignment of the foundation bolts. Additionally, it eliminates the difficulty required to lift the compressor totally off its foundation and also the need to line up bolts by bending them, which reduces the frequency of regrouting jobs.

Method suggested by Eurie A. Dozier. Courtesy Esso Standard Oil Co., Baton Rouge, La.

## Insulating Return Bends

AN improved method of insulating 180° return bends on acid reboilers and concentrators in alcohol department at Esso Standard Oil Co.'s Baton Rouge plant eliminates the need for reinsulating the bends when they are removed during turnarounds.

Originally, the return bends on the acid vessels were insulated throughout their length, from flange to flange. To permit unbolting the flanges, it was necessary to chop away the insulation several inches behind the flange each time the bends were removed for cleaning. This not only involved insulation-removal costs, but also made it necessary to reinsulate each bend after it was replaced and returned to service.

The new insulation design for the bends provides a much more durable covering and eliminates the need for removing and replacing portions of the insulation each time the boilers are dismantled. Each bend is now equipped with a permanent type insulation with no insulation installed 7 in. back from the flange on each end of the bend. Heat loss through the bared sections of the return bends is inconsequential.

In applying the permanent type insulation, each bend is first covered with a 2-in. sponge felt insulation, with poultry netting tightly bound around the sponge felt. Then a coating of 302 Rubberoid cement mixed with portland cement is applied to make the insulation weatherproof. No insulation will have to be removed before the bends are removed from service and depending upon handling, little or no insulation will be required after they have been returned to service.

Working conditions have also been improved since under previous operating conditions, minimizing down time of a unit would sometimes require the reinsulation of the compactly arranged bends while the unit was on stream and insulators would have to use extreme care due to the temperatures involved.

Method suggested by Nesom D. Wascom, first-class insulator.

**Permanent-type insulation is employed in return bends 7 in. back of flange, to permit unbolting of flanges without stripping insulation.**


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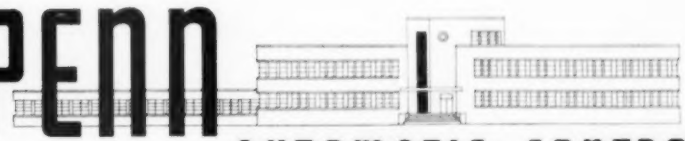

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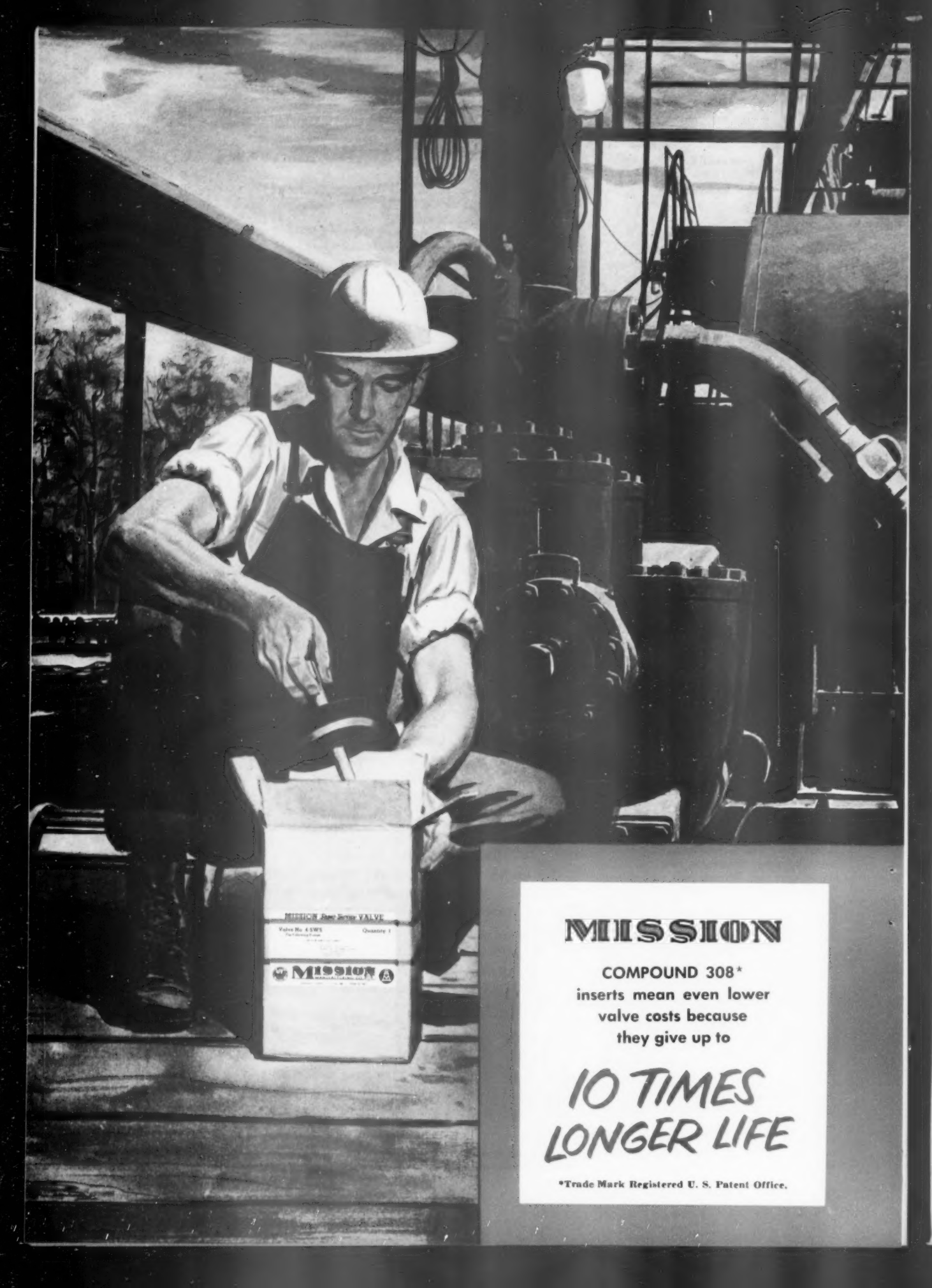


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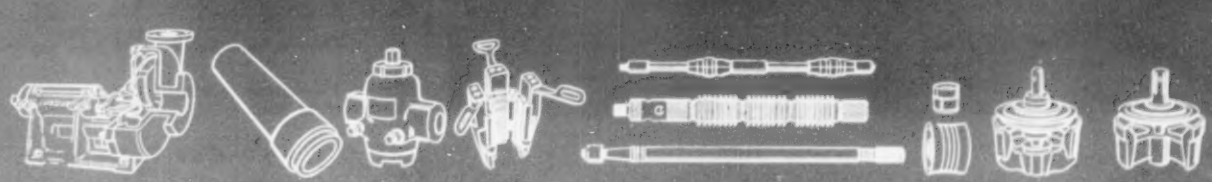

# One Pump Installation Produces From Two Pay Zones

THE problem of pumping one well from two different oil-producing zones at different intervals has been solved by Cities Service Oil Co., through use of a special changeover tool designed by J. R. Hatfield, division chief petroleum engineer.

The unit utilizes one sucker rod and a simple sleeve arrangement, and thus solves the intricate dual-zone-produc-


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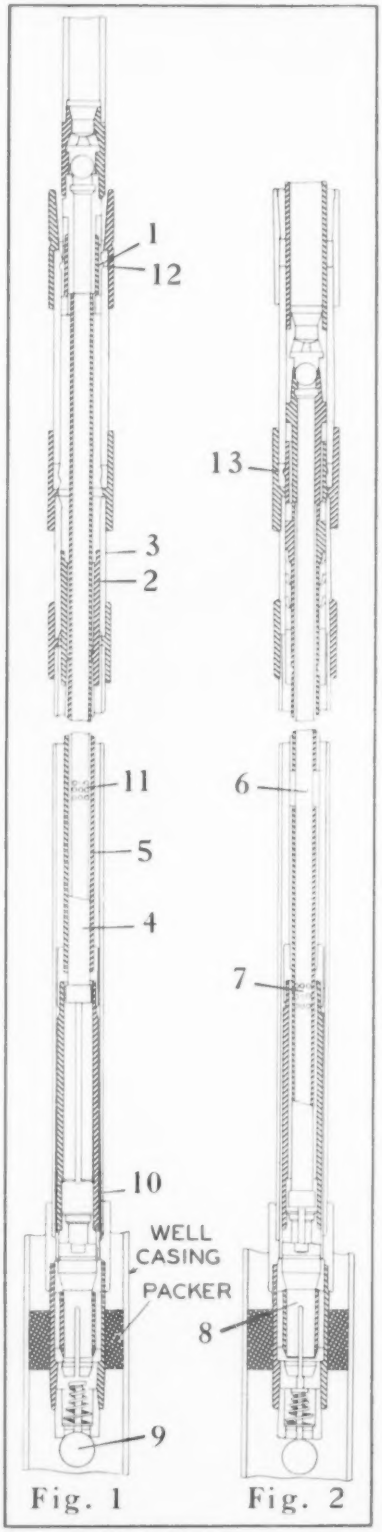


Fig. 1—Tool in position to pump from top zone.

Fig. 2—Changeover tool in position to pump from bottom zone.

tion problem by alternately pumping selectively from two different zones.

The first such unit put in service by the company was for deep dual pumping in Shafter Lake pool, Andrews County, West Texas. The big individual pumping unit itself has a 9-ft. lift and a polished-rod capacity of 30,000 lb. It is producing a well from the Clearfork at 8,500 ft., and the Devonian from 9,500-9,600 ft.

Cities Service has been successful in alternate pumping of two zones through the same well bore at depths down to 10,000 ft., both in West Texas and in Kansas.

**Old method . . .** Before the changeover tool was perfected in April 1950, a number of well installations were made in Kansas in the following manner to produce two productive zones.

. . . 1—A production packer was set in the casing between the producing zones.

. . . 2—A footpiece was put on bottom of the tubing, extending through the packer. This footpiece contained perforations, and lowering the tubing would cause perforations to move to a point below the packer, thus permitting the lower zone to be produced. Raising tubing slightly would raise the perforations above the packer, thus shutting off the lower zone and permitting oil to enter tubing from the top zone.

. . . 3—A packing material was used between the packer and tubing. Thus, when one zone was being produced, the other zone was shut off.

**New method . . .** The accompanying drawings (Figs. 1 and 2) show a cross-section of the new changeover tool and how it works. The tool is about 5 ft. long, and consists of the following (numbers refer to drawings):

(1) A spring-positioning device with

**Fig. 3—Cities Service Oil Co. dual-zone pumping unit is located in the Shafter Lake pool, Andrews County, West Texas.**

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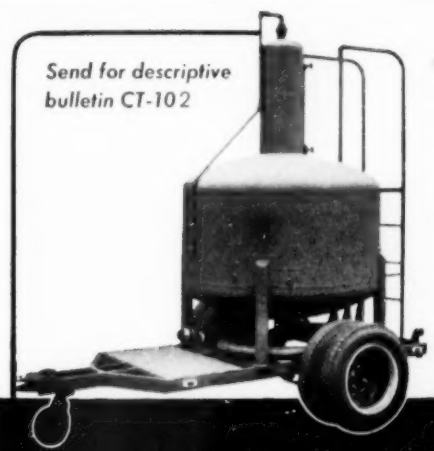

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recesses at points (12) and (13) for positioning (1); seating nipple (3), pack-off cups (2) in the tube (4) and slots (6) in tube (5) constitute the valve mechanism. Bottom lock hold-down (6) seats in a conventional shoe.

Packer can be positioned immediately below the shoe or any distance below, depending on conditions.

**In Fig. 1** the tool is in position to pump from the top zone, with (1) set at (12). Oil enters tubing through holes at (10), travels around annulus and enters tubes (5) and (4) at (11), and then moves from here on up through the standing valve and insert pump.

**Fig. 2** shows the changeover tool in position to pump from the bottom zone, with positioning device (1) at (13). Rod string must be bumped to force part (1) out of recess (12) and down to recess (13). In position (13) tube (4) has been lowered to the point where perforations (7) extend below tube (5) and the rod extension on tube (4) forces ball (9) away from its seat, permitting oil to enter the bottom of tubing, then move up around tube (4) through perforations at (7), then on vertically through standing valve and insert pump. The device can accommodate any make of insert pump and standing valve.

Present design calls for use of a pulling unit to change from one zone to the other. A total of 30 polished rods are used, permitting changing without removing stuffing box.

Plan of operation, generally, is to pump one zone the last half of a month, and the first half of the following month, with changeover being made in the middle of the month. In this way only one change a month is needed to pump a well's allowable from each pay zone.

**Differences noted . . .** Sufficient difference in crude produced from the two zones is usually evident. A report is made each time the tool is changed, indicating gravity and color, and hydrogen sulfide content of the gas. Also recorded is the time required for oil to reach the surface.

A well-head valve is opened to direct oil through a line to the proper tank battery. Either zone can be shut off by blanking tools.

## Answer to Check Chart

The puzzle picture appearing on page 122 of this issue is correctly identified as a Hercules leaf-type pressure filter, in which diatomaceous earth serves as the principal filtering medium.

PUMP SELECTION—4

# Specifying the Process Pump

**by Robert L. Jacks***

GENERAL design factors for centrifugal and reciprocating pumps have been given earlier in this series. Rotary type (gear or screw) may also be employed. These are positive-displacement units particularly adapted to the pumping of high-viscosity liquids which cannot be pumped satisfactorily with centrifugal pumps. Other special types are vertical well-type encased centrifugal pumps and proportioning or controlled-volume pumps.[1]

### Design Procedure—New Installation

The design of a new pump installation should never be undertaken without first making a schematic picture of the system involved. This picture should include all piping, equipment, controls, and the like from the constant pressure point on the pump suction to the constant pressure point on the pump discharge. Once this is drawn, the considerations required to complete the "process specification sheet" are simplified. The "process specification sheet" is shown in Fig. 1. Its function, as mentioned previously, is to facilitate the recording and transfer of the vital process information items to the mechanical designer, estimator, and pump manufacturer. It can also be referred to as a "conclusion sheet" since it sets down the results of the process design calculations. These calculations, furthermore, can be made with the "specification sheet" as an outline thus providing a quick means of file reference to any particular point in the design at a later date.

A number of the specification items listed on the form of Fig. 1 are self-explanatory, and their values can be readily found using one of the many standard data references available in most engineering libraries. Other items on the form require more effort in their evaluation so that some explanation is justified and this will be given in the installments to follow.

### Reference

1. Sheen, Robert T., Chemical Engineering Progress, 44, 327-332 (1948).

*Esso Standard Oil, Louisiana Division, Baton Rouge. Excerpt from paper in Chemical Engineering Progress, May 1953, page 235.

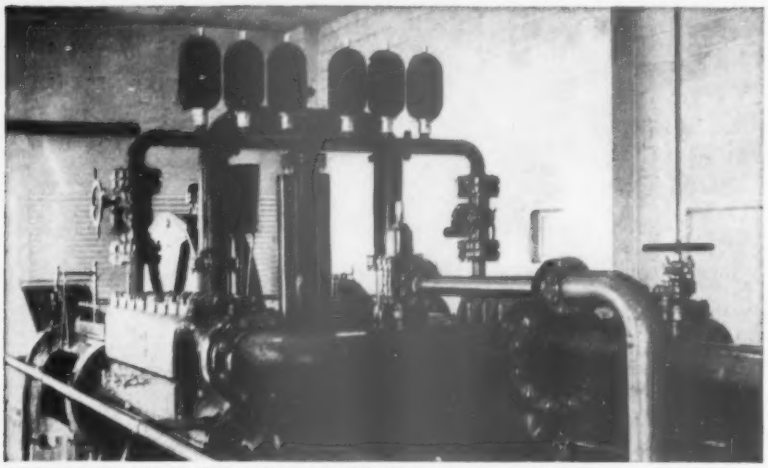
**PROCESS SPECIFICATION FOR PUMPING EQUIPMENT**

| | | | |
|---|---|---|---|
| PROCESS DESIGN | PJC | PLANT | CPLA-2 |
| CHECKED BY | RLJ | SPEC. NO. | BR-000 |
| DATE | 3/20/52 | ITEM NO. | P-105 |
| **GENERAL** | | | |
| SERVICE | | | Furnace Feed |
| NO. OF PUMPS REQUIRED | IN REGULAR USE | | 1 |
| | AS SPARES | | 1 |
| **PROCESS REQUIREMENTS PER PUMP** | | | |
| FLUID HANDLED | | | Gas Oil |
| QUALITY OF FLUID | CORROSIVE OR NON-CORROSIVE | | Slightly Corrosive |
| | CORROSIVE COMPOUNDS | | Sulfur |
| | SOLIDS (IF ANY) | | None |
| QUANTITY HANDLED G/H AT 60°F & 760 MM | | | 18,350 |
| SPECIFIC GRAVITY AT 60°F & 760 MM | | | 0.882 |
| PUMPING TEMPERATURE | | °F | 150 |
| VISCOSITY-CENTIPOISES AT PUMPING TEMP. | | | 8.5 |
| **SUCTION CONDITIONS (AT PUMP)** | | | |
| PRESSURE | P.S.I. (ABS. OR GA.) | | 0 psig |
| VAP. PRES. AT PUMP TEMP. | P.S.I. (ABS. OR GA.) | | Negligible |
| SP. GR. AT PUMP TEMP. & SUCTION PRESS. | | | 0.840 |
| NET POSITIVE HEAD ABOVE VAP. PRESS. | FT. | | 40.4 |
| **DISCHARGE CONDITIONS (AT PUMP)** | | | |
| PRESSURE | P.S.I. (ABS. OR GA.) | | 220 psig |
| SP. GR. AT PUMP TEMP. & SUCTION PRESS. | | | 0.840 |
| CAPACITY AT DISCH. COND. | GPM | | 294 |
| **DESIGN CONDITIONS** | | | |
| DIFFERENTIAL PRESSURE | | P.S.I. | 220 psig |
| | | FT. | 605 |
| LIQUID HORSE POWER | | | 37.7 |
| MAXIMUM TEMPERATURE | | °F | 250 |
| MAX. SUCTION PRESS. | P.S.I. (ABS. OR GA.) | | 10 psig |
| MAX. ALLOWABLE PUMP ΔP, | P.S.I. | | 290.2 |
| **REMARKS** | | | |
| (SPECIAL REQUIREMENTS OF PUMPS OR DRIVERS, ETC.) | | | |
| Type of Pump Recommended | | | Centrifugal |
| Type of Driver Recommended | | | |
| Regular | | | Motor |
| Spare | | | Turbine |

Fig. 1.

# GREER TOPICS

**Functions and Applications of the Greer Accumulator**



PORTLAND PIPELINE CORPORATION engineers no longer worry about the problem of pump pulsations since Greer accumulators were installed on their equipment. Pressure surges from reciprocating pumps were rendered harmless. See below.

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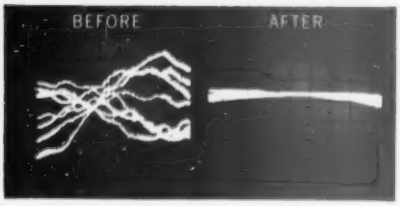


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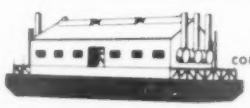

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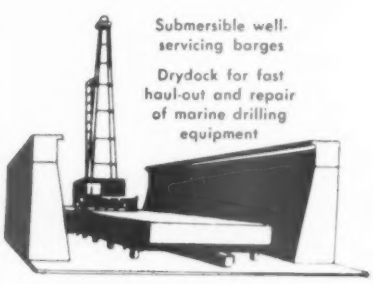

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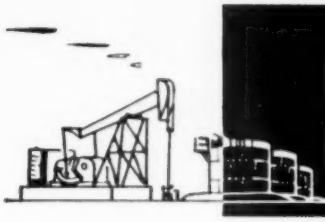

ENGINEERING FUNDAMENTALS

ELECTRIC LOGGING—5

# Classification of Formations For Electric-Logging Purposes

by R. I. Martin*

AT this stage it will be advantageous to set up a classification of reservoir rocks in three different groups according to their lithology, and consequently their resistivity characteristics.

This classification can be no more rigid than the differences which prevail among sedimentary rocks. Consequently gradations from one class to the other will be found.

**1. Soft Formations**

These include unconsolidated sands and porous shales. Often a 10 or 20-ohm-m scale is used for recording the resistivities. The shales have a resistivity of a fraction of an ohm-m up to about 2 ohm-m. The sands have comparatively low resistivities which may not exceed 10-20 ohm-m if the sands are oil bearing, or may be approximately equal to the shale resistivities if the sands are water bearing. Examples are the Miocene in California, and the Oligocene and Eocene in the Gulf Coast.

**2. Intermediate Formations**

These formations are of older age and differ from the first group only because they are less porous, on the average. Consequently, they have higher formation factors and for this reason exhibit higher resistivities.

They consist of compact and sometimes highly calcareous shales, and consolidated or cemented sandstones. As in the previous case the sands, if oil bearing, are more resistive than the surrounding shales, and have the same resistivity as these shales, or even less, if they are water bearing. The resistivity scales used in logging may vary from 50 to 150 ohm-m. Examples of this type are the sands of the Mid-Continent area.

**3. Hard Formations**

Very highly cemented sandstones and some limestones are considered in this class. The criterion from the point of view of logging is the absence of connected pore space. A sandstone which is completely cemented is not essentially different from a dense limestone as far as the response on the electric log is concerned. A single layer of such material will exhibit a high resistivity and no spontaneous potential. If permeable zones are present they will appear as intervals of lower resistivity. This is true even though such intervals may contain oil or gas. The presence of connate water, even though the amount is small, results in a marked decrease in resistivity. The effects recorded on the S.P. curve are also more complex, than in the first two classes.

Because of this different response, and also because the interpretation is not always clear in practice, special logging methods have been developed. (A discussion of the response of conventional logging methods and also the new methods will be considered later.)

As limestones are found with a variety of different types of pore openings the response on the electric log is correspondingly variable. When the limestone is oolitic, its behavior from the logging point of view is similar to that of sands. If the porosity is intergranular, the log obtained is intermediate in character. A knowledge of the character of the limestone is important when interpreting electric logs.

*Assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.

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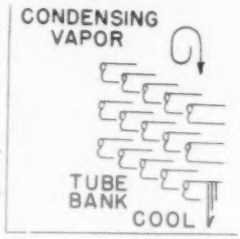
Part 37 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

# $h_f$ HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a BANK of COOL TUBES and a CONDENSING VAPOR




Tube Position: Horizontal

Tube Arrangement: Vertical tier of tubes

Vapor Velocity: Low to Moderate

EQUATION:

$$h_f = 0.725 \left[\frac{K^3 \rho^2 \lambda g}{N D_o \mu \Delta t}\right]^{0.25}$$

TERMINOLOGY:

- $h_f$ - Mean value of coefficient of heat transfer for entire tube bank, BTU/hr./sq. ft./°F.
- $K$ - Thermal conductivity of condensate film at $t_f$, BTU/hr. ft. °F.
- $\rho$ - Density of condensate film at $t_f$, lbs./cu. ft.
- $\lambda$ - Latent heat of condensate of vapor at $t_v$, BTU/lb.
- $\mu$ - Viscosity of condensate film at $t_f$, lbs./hr. ft.
- $g$ - Acceleration due to gravity, $4.17 \times 10^8$ ft./hr. hr.
- $D_o$ - Diameter of tubes, ft.
- $\Delta t$ - Temperature difference between dew-point of vapor and tube surface, °F.
- $N$ - Number of tubes in a vertical tube bank.
- $t_v$ - Dew point temperature of the vapor, °F.
- $t_f$ - Temperature of condensate film, °F.; $t_f = t_v - 3/4\Delta t$.

LIMITATIONS:

Used only for film type condensation where streamline flow exists in condensate film and vapor velocity is not high. Condensate dripping from tube above is assumed to do so without splashing. May be low. To correct, $N^{2/3}$ may be substituted for N to provide for splashing.

PHYSICAL CONSTANTS: See Chemical Engineers' Handbook - J. H. Perry (1948).

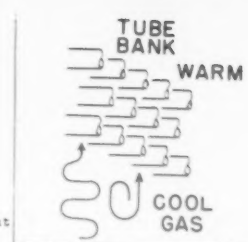
for $\rho$ -- see pp. 130-148, 175-195, 1583.
$\mu$ -- see pp. 370-374, 1198, 1696.
$K$ -- see pp. 459-461, 1303, 1697.
$\lambda$ -- see pp. 210-218, 299, 249-281, 1685.

REFERENCES:

1. D. A. Donohue, Ind. Eng. Chem., p. 39 (1947).
2. R. E. Peck and L. A. Bromley, Ind. Eng. Chem., p. 36 (1944).
3. W. H. McAdams, Heat Transmission, 2nd Edition, p. 268 (1942).
4. Unit Operations, Brown, pp. 449.
5. Process Heat Transfer, Kern, pp. 261-265.

L 3

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a BANK of WARM TUBES and a COOL GAS




Tube Position: Horizontal

Tube Arrangement: Staggered In line

Gas Movement: Natural Convection-Turbulent

Direction of Movement: Normal to tubes.

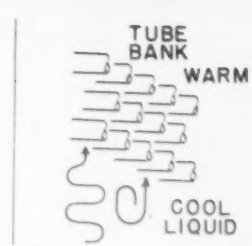
Reference should be made to equations

L 1 a
L 1 c (1)
L 1 c (2)

for equations applicable to heating a liquid by passing it over a bank of heated horizontal tubes in a direction normal to the axes of the tubes in the bank.

L 4 a, c

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a BANK of WARM TUBES and a COOL LIQUID




Tube Position: Horizontal

Tube Arrangement: Staggered In line

Liquid Movement: Natural convection - Turbulent

Direction of Movement: Normal to tubes

Reference should be made to equations

L 2 a
L 2 c (1)
L 2 c (2)

for equations applicable to heating a liquid by passing it over a bank of heated horizontal tubes in a direction normal to the axes of the tubes in the bank.

L 5 a, c

# CORROSION CONTROL

## Locating High-Resistance Joints in Underground Piping

**by Marshall E. Parker***

EFFECTIVE cathodic protection of underground piping requires that the piping be a continuous electrical conductor throughout the system to be protected. Nonconducting or high-resistance joints are undesirable for two reasons; their inability to pass current deprives a part of the piping of the protection which is desired, and, even worse, there may be leakage of current through the soil past the joint, which will subject one end of the joint to the destructive action of current discharge. It is necessary, therefore, to locate and bond all such joints when a cathodic protection system is installed.

Welded joints are, of course, fully conductive and need no bonding. Screwed joints are nearly always satisfactory; occasionally one will be found which is insulating. This is most likely to occur on small pipe—2-in. and under. Screwed joints which are conducting may be depended upon to remain so. Flanged joints, likewise, are usually satisfactory, but again an occasional high-resistance joint may be encountered. Conductive flanged joints may also be depended upon to remain satisfactory.

It is with the sleeve-type mechanical joints that the greatest difficulty is encountered. These (unless joints of special design are used) cannot be depended upon to conduct or to insulate. Nor can joints be depended upon to remain in the condition in which they are found at any given time. It is strongly advised, therefore, that all such joints be bonded whenever they exist in a system.

**Locating high resistors...** The basic principle by which high-resistance or nonconductive joints are located is relatively simple: the line has a voltage imposed along it, and the potential drop is investigated to locate points of discontinuity. The voltage may be imposed by two methods, and two methods may be used to check the voltage drop; in combination, this gives four different techniques which may be used.

One method of imposing voltage drop along a line is that of applying cathodic protection, either through a regular installation or by temporary means, using a driven pipe ground bed (or perhaps an isolated metallic structure which is available) and a welding machine or storage battery as a source of power. This will cause current to flow along the line in the direction of the drainage point; there will be a drop across any high-resistance joint, and a sharp drop across any which is totally insulating. Often only the first such joint can be located in this way, there being too little current pickup beyond it to be effective. Once this joint is found and bonded, the next can be located, and so on until the region of influence of the drainage is covered.

The other method involves applying a direct potential to a section of the line. A cable must be stretched, and a battery or other source of voltage used, connected to the line at two separate points. If there is only one insulating joint between the two points, a very sharp indication will be obtained; if there are several, it will still be possible to detect them, usually. If there are no totally insulating joints, all high-resistance joints will be easily found. Should the line be entirely free of such joints, there will be an almost perfectly uniform potential drop between the two connections (assuming the line to be of uniform pipe).

The simplest method of detecting the discontinuities which lie along a nonuniform line is by the exploration of the surface potential above the line. To do this, one terminal of the instrument (either a potentiometer or a high-resistance voltmeter) is connected to a fixed point on the line, and the other to a copper sulfate electrode which is placed directly above the line at intervals. If the soil resistivity and the depth of burial are uniform, the surface potential will vary smoothly from one end of the section under study to the other, except where there are variations in the conductance of the pipe—and these are the poorly conducting or insulating joints which are being sought. Under most conditions, these may be located within a foot or two by careful measurement. It is advisable to make a plot of the readings obtained, so that variations in slope can be readily detected.

**Line drop...** The surface potential method, however, may be disturbed by variations in the soil, in the depth of burial, or in the coating of the line. A sharper technique is the study of the potential drop in the line itself. For this, a low-range high-resistance voltmeter (from 1 to 10 mv. full scale) is most suitable. One terminal is connected to a fixed point on the line, and the other successively to the line itself; by means of contact bars. Again a plot of the readings should be made, so that they may be taken in whatever order seems most useful, doubling back to find the exact location of the steep drops which indicate poorly conducting joints.

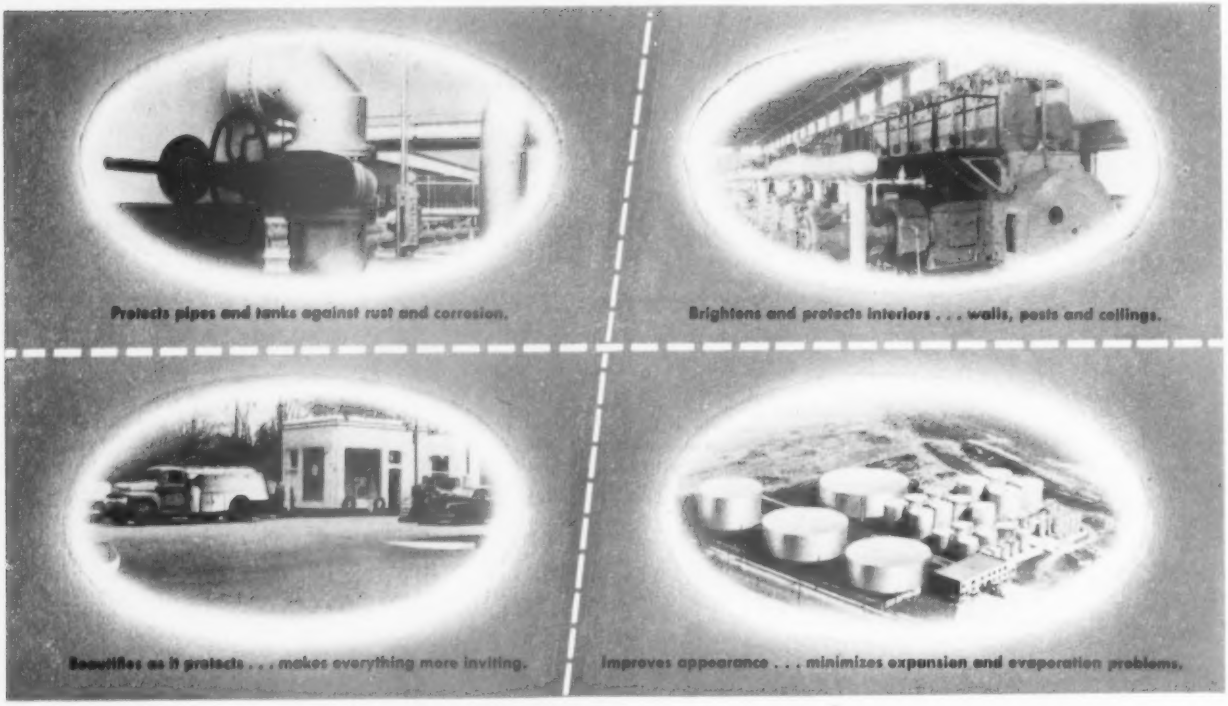
If the attempt is being made to locate **all** mechanical joints, whether high resistance or not, then those which happen to be good conductors must be found by actual excavation and search. It is most helpful, of course, to find and stake first all of those which can be located electrically; then, with the help of such information as is available as to the length of the pipe joints used in the project, a much more intelligent set of guesses can be made as to the location of the others.

The methods which have been described all use direct current; it is also possible to locate such joints by the alternating current supplied by a conductive-type pipe locater. Instead of surface potentials, the indications given by the locater coil and amplifier are used; the principle involved is that the signal will not carry well beyond an insulating joint. However, it will be found that it is difficult or impossible to locate high-resistance joints by this method, and the fact that the readings cannot easily be plotted make careful study of the results difficult.

Of all the methods discussed, this is probably the most rapid, but the least effective; the most positive technique is that of applying direct potential to the line itself, by the use of a cable, and then measuring the potential drop in the line, by the use of contact bars. This method, while slow and tedious, is almost completely free of outside factors and can be depended upon to locate all high-resistance joints with whatever accuracy is needed.

*Consultant, Houston.

# A Shining Coat of Armor-


Protects pipes and tanks against rust and corrosion.
Brightens and protects interiors . . . walls, posts and ceilings.
Beautifies as it protects . . . makes everything more inviting.
Improves appearance . . . minimizes expansion and evaporation problems.

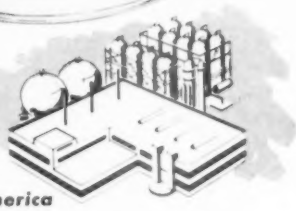
# "Liquid Aluminum"

**M**aintenance problems diminish . . . and the whole site takes on an attractive, sparkling, well-kept appearance when *Liquid Aluminum* is used. It's the petroleum industry's most protective and beautiful coating. Use it inside and outside. Gleaming *Liquid Aluminum* is amazingly resistant to money-eating rust . . . it also resists corrosion from smoke and fumes. It reflects up to 85% of heat and light rays and thus reduces evaporation losses . . . minimizes expansion and contraction problems . . . and makes plant interiors and exteriors brighter and more cheerful.

Look for the *Liquid Aluminum* label on the aluminum paint you specify. It's made to approved standards by leading paint manufacturers. Ask your paint supplier or write for names of manufacturers to Reynolds Metals Company, 2595 South Third Street, Louisville 1, Kentucky.

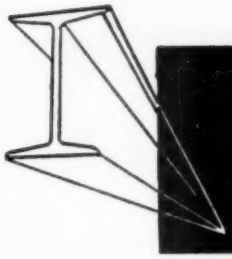
## 1-Coat Protection for Your Built-up or Rustable Metal Roofs

It's *Liquid Aluminum* Roof Paint or Coating with this label and this warranty. It will add years to roof life . . . and keep buildings cooler in summer . . . cut air conditioning costs . . . increases employee efficiency and morale. The *Liquid Aluminum* label and the special Warranty Seal are your assurance of top quality. Write for folder.



*This advertisement appears in the interest of the Paint Industry of America*

by W. L. Nelson
Technical Editor



# PROGRESS IN METALS

## Heat-Resistant Furnace Castings

HIGH-TEMPERATURE (above about 1,200° F.) steel castings are usually classified according to their resistance to:

1. Oxidizing atmospheres.
2. Oxidizing atmosphere in the presence of sulfur.
3. Reducing atmospheres.

Most refinery furnaces or power-plant furnaces operate with an oxidizing atmosphere and if the sulfur content of the fuel is abnormally high, a sulfidizing atmosphere results. Oxidizing atmospheres are best handled by the chromium steels which contain nickel as by compositions between 18-8 and 25-20, whereas reducing atmospheres require the nickel steels which contain chromium (15-65; 15-35; and 20-25). The straight chromium steels (13 to 28 per cent) are satisfactory for sulfur-containing atmospheres but they are not as good as the chromium-nickel steels. The high nickel steels are rapidly destroyed by sulfur-containing atmospheres. The general relationship is indicated in Table 1.

Flue gases which contain more than about 100 grains of sulfur dioxide are a source of sulfide corrosion. The sulfur content of flue gas is related to the sulfur content of the fuels, or to the regions from which they derive, as indicated in Table 2. Natural gas either contains little sulfur or it is desulfurized. Accordingly, the flue gas obtained when burning natural gas or purified coke oven or producer gas contains only 5-10 grains of sulfur dioxide per 100 cu. ft. Unpurified manufactured gas usually contains 125 grains sulfur dioxide.

The chemical compositions and creep strengths of high-temperature alloy-steel castings were presented on the Progress in Metals page of April 27, 1953. The straight chromium steels HC and HD (really up to about 4.7 per cent nickel and 0.5 per cent molybdenum) can be used up to temperatures of about 1,600° F. and for high-sulfur atmospheres if strength is of little significance. If strength is also required the chromium nickel steels are recommended (HE, HF, HH, HI, HK, and HL). The high nickel stainless steels cannot be used for high-sulfur atmospheres and they are expensive but they are slightly stronger at elevated temperatures than the other alloys and they are not carburized or embrittled by a reducing atmosphere. The Progress in Metals page of May 25, 1953, pertaining to the feasibility of chromium steels indicates clearly that the saving in oxidation loss nearly always pays for the greater cost of high-alloy furnace castings.

End supports for tubes in pipe stills can usually be protected from the hot gases and temperature by insulation. Thus, plain cast iron or very low alloy (1 per cent Cr) cast iron can be used. In the convection section of a pipe still or economizer parts of steam plants, higher alloy-content irons such as those indicated in Table 3 are useful. At 1,500° F. gray iron oxidizes about 16 times faster than the Ni-resist iron of Table 3 but, of course, the alloy iron costs at least 13 times as much as gray iron.

**TABLE 1—CHOICE OF CASTINGS FOR VARIOUS FURNACE ATMOSPHERES**

| | Approx. scaling temperature | | |
|---|---|---|---|
| | Oxidizing | Reducing | Sulfidizing |
| 13 straight chromium | 1,400 | 1,100 | |
| 18 straight chromium | 1,500 | 1,300 | 1,300 |
| 23 straight chromium | 1,800 | 1,500 | 1,500 |
| *HC 28 straight chromium | 2,100 | 1,700 | 1,700 |
| *HF 18-8 chromium nickel | 1,600 | 1,300 | 1,600 |
| *HH 24-12 chromium nickel | 2,000 | 1,900 | 2,000 |
| *HE 28-10 chromium nickel | 2,100 | 1,900 | 2,000 |
| *HK 25-20 chromium nickel | 2,100 | 2,000 | 2,100 |
| *HX 65-15 nickel chromium | 1,800 | 2,100 | |
| *HT 35-15 nickel chromium | 1,900 | 2,000 | |
| 25-20 nickel chromium | 2,000 | 2,000 | |

*Approximate grade of Alloy Casting Institute.

**TABLE 2—APPROXIMATE SULFUR DIOXIDE CONTENT OF FLUE GASES**

| Source— | Grains per 100 cu. ft. | % S in fuel |
|---|---|---|
| **Residual Fuel Oils** | | |
| Best metallurgical grade | 49 | 1.0 |
| Average* | *60 | 1.22 |
| East Coast | 98 | 2 |
| From 13-20 A.P.I. crude oils | 147 | 3 |
| Middle East crude oils | 196 | 4 |
| Highest sulfur | 235 | 5 |
| **Bituminous Coals** | | |
| Eastern | 62 | 1.0 |
| Eastern (about average) | 76 | 1.22 |
| Eastern and lower midwestern | 124 | 2 |
| Midwestern | 186 | 3 |
| Midwestern (about average) | 248 | 4 |
| Midwestern | 310 | 5 |
| Lowest grades | 496 | 8 |

*According to H. R. Clauser, Heat-Resistant Castings, Their Composition and Application, Materials and Methods, October 1950, page 79.

**TABLE 3—CONVECTION SECTION TUBE SUPPORTS**

| | Approx. chemical composition | | | | Scaling temp.* (°F.) | Design strength† | Notes |
|---|---|---|---|---|---|---|---|
| | Total carbon | Silicon | Chromium | Nickel | | | |
| Gray cast iron | 3.2 | 1.5 -2 | 0 | 0 | 600 | | Insulated end supports |
| Meehanite iron | 3.0 | 1.0 -1.4 | 0.5-1.0 | | 900 | | Convection section and insulated end supports |
| Nickel chromium iron | 3.2 | 1.2 -2.7 | 0.5-0.75 | 1-4 | 1,000 | 200 | Convection tube sheets |
| Scale-resisting iron | 2.6-3 | 1.25-2.2 | | 12-15 | 1,300 | 300 | Convection tube sheets |
| Ni-resist iron | 3.04 | 1.62 | 3.27 | 14.31 (5.33 Cu) | 1,400 | 300 | Convection tube sheets |
| HC cast steel | 0.5 max. | 2.0 max. | 26-30 | 4 max. | 1,500 | 400 | Hottest convection supports |

*Oxidizing atmosphere with moderate sulfur content in flue gas. †Based on creep strength at scaling temperature.

# New Way to Reduce Sling Costs 22.3%

*Notice how Pin-Lock Thimbles are held securely in position by steel pins. These pins make it easy to transfer Pin-Lock Thimbles to replacement Red-Strand Slings.*

**Save by reusing Pin-Lock Thimbles on Red-Strand Braided Slings**

Now . . . *stop* discarding still-good sling thimbles! With Red-Strand Braided Slings, you simply transfer *reusable* Pin-Lock Thimbles from one sling to another. *Cut costs substantially.*

Savings of 22.3% are typical. See chart at left for other examples.

Pin-Lock Thimbles also guard against unexpected damage to sling loops. They're made of extra heavy, extra durable cast steel.

*You save still more* because Red-Strand Slings are made of higher-than-rated quality Leschen wire rope—famous for longer-than-expected service.

Doesn't this suggest checking Red-Strand Slings *right now?*

| HERE'S HOW MUCH YOU SAVE WITH Red-Strand SLINGS AND Pin-Lock THIMBLES | |
|---|---|
| Sling Size | % Savings |
| 9/16" x 10' | 33.0% |
| 1/2" x 10' | 23.6% |
| 1/2" x 20' | 17.2% |
| 3/8" x 8' | 22.3% |
| 1/4" x 5' | 15.5% |
| 3/16" x 8' | 13.0% |
| 3/32" x 10' | 8.5% |

*See your LESCHEN representative or write for folder, "NEW IDEAS in Slings."*

A. Leschen & Sons Rope Co.
St. Louis 12, Mo.




**LESCHEN**

***Red-Strand* SLINGS & WIRE ROPE**
*of Higher-Than-Rated Quality*



# LESS CAGE WEAR

Used in check valves, the remarkable lightness (⅓ less than steel) of Kennametal Titanium-Carbide* Balls prevents excessive cage wear, and minimizes damage from ball flutter and fluid pounding. Their great resistance to corrosion provides unexcelled performance in sour crudes and hydrogen sulfide gases — resistance to shock and wear is 20 times greater than that of alloy steel.

Kennametal API Lightweight Titanium-Carbide Balls are available from your regular supplier. Kennametal Inc., Latrobe, Pa.

**Called Kentanium*

**KENNAMETAL**
**Balls and Seats**

Shock- and wear-resistant Kennametal Balls and Seats are furnished in matched sets. Balls available in either lightweight Titanium Carbide or in the regular Kennametal Tungsten Carbide. Seats are Tungsten Carbide.

**KENNAMETAL®**
PUTS AN END TO DOWN-THE-HOLE CHECK VALVE TROUBLE

# Heating-Oil Instability . . . Test Procedure

ACTION of a new domestic furnace oil inhibitor, which prevents coalescing of gums and reduces gum formation, has been dealt with in the preceding installment (Refiner's Notebook, July 6).

Where distillate fuel blends include a large proportion of raw cat cracked stocks, the inhibitor is still useful by making it possible to reduce the extent of chemical treatment required for a suitable product, or by increasing the proportions of untreated cracked gas oil which can be used for satisfactory performance. The magnitude of the increases are on the order of 50 per cent to 100 per cent. For example, the proportion of untreated cracked stock which may be included can be increased from 10 per cent without inhibitor to 15 per cent or 20 per cent in the final blend when inhibitor is used. Similarly, chemical requirements for treating processes can be cut by 25 per cent to 50 per cent without sacrificing quality when inhibitor is used.

**Rust-proofing properties . . .** The inhibitor imparts to an oil exceptional rust-proofing properties so that steel and iron surfaces with which it comes in contact are made corrosion resistant. The additive will not, however, remove rust from already rusted parts.

### Ability of Furnace Oil to Settle "Bright"

Many heating oil additives promote the retention of moisture as a cloud after the oil contacts water in storage tanks, tankers, or at other points during transportation to the consumer. This creates a distressing problem for the oil supplier, either the refiner or the distributor as the case may be.

From material furnished by Oronite Chemical Co.

The inhibitor dealt with here does not emulsify water with fuel oil. Neither does the additive keep water suspended in the fuel for prolonged periods. Heating oils containing inhibitor will settle "bright" in approximately the same length of time after contact with water as will the straight run oils which, generally, do not require an additive.

### Test Procedure

A simple, direct procedure can be employed to demonstrate the filter plugging tendency of distillate fuel oils. Apparatus required includes: Hand vacuum pump or aspirator; 250 ml. separatory funnels; 25 ml. graduate; 100 ml. graduate; sintered glass crucible of coarse porosity with a 1½ in. bowl diameter; No. 2 filter papers, 1⅛ in. diameter; 500 ml. vacuum flask; 50 ml. sample of tap water; 300 ml. sample of furnace oil; vial of Oronite inhibitor.

Procedure for carrying out this test follows: Insert one of the filter papers in the sintered glass crucible. Measure into one of the two separatory funnels 150 ml. of the oil to be tested; add 25 ml. tap water, stopper the funnel, and shake the mixture vigorously for 15 to 20 seconds. Remove the stopper and filter the entire contents of the separatory funnel through the filter paper with the aid of vacuum supplied by the hand pump. Remove the filter with tweezers and lay it right side up on a blotter to dry. The darkening of the paper shows the fuel's tendency to plug filters. This discoloration is compared to a set of eleven filters numbered 0 to 10, and the test crucible is rated accordingly. A zero rating represents a clean filter; a 10 rating represents a discoloration typical of that obtained with the average diesel and furnace fuels on today's market.

Into the second separatory funnel measure another 150 ml. portion of the test oil. Add one drop of inhibitor, stopper the funnel, and shake to disperse the additive (one drop of inhibitor corresponds to the additive concentration recommended for use in an average furnace oil). Add 25 ml. tap water to the blend, stopper the funnel, and shake vigorously for 15 to 20 seconds. Place a second filter paper in the glass cubicle and filter as before. Place the second filter paper on the blotter next to the first. The contrast illustrates the effectiveness of inhibitor in preventing the formation of filter deposits usually obtained with ordinary furnace oils.

### Recommended Dosage

The stabilizing action and rust inhibiting quality are obtained at very low dosages. For use in the average furnace oil available on today's market, it is suggested that the inhibitor be mixed with the finished product as soon as possible after it is refined. Beneficial effects can be obtained by adding inhibitor to a fuel at any time, however. The applicator of inhibitor at the recommended rate of one pint per 1,000 gallons of furnace oil, entails a treating cost of approximately two cents per barrel of fuel.

For the refiner, the use of this inhibitor offers these advantages:

1. A rust inhibitor for straight run fuel stocks not requiring a gum inhibitor.

2. An effective gum and deposit inhibitor for blended fuel stocks.

3. The use of greater proportions of cracked fuel stocks in present fuel blends.

4. A reduction in the severity of the chemical treatment of cracked stocks to make them usable in blends, with a resulting saving in over-all treating and blending costs.

**Major Utilities Demanding Quality Specify Roskote Cold-Applied Mastic**

**Equitable Gas System and Over 100 Others Use Roskote and Glas-Wrap on the "Tough" Pipeline Jobs**

Equitable Gas System, covering large areas in Western Pennsylvania, West Virginia and Kentucky, uses non-toxic Roskote *cold-applied* mastic and Royston Glas-Wrap. They, as well as over 100 other major utilities and pipeline companies, know that Roskote and Glas-Wrap give pipelines peerless, long-time protection.

Upper Right—An Equitable Gas System 20" line through rough country. Upper Left—First coat of Roskote being sprayed on this line in the field, no primers needed. Bottom—The pipe is then wrapped with Royston Glas-Wrap and given a second coat of Roskote.

Not just the easy jobs for Roskote! It's tough enough to withstand the abrasion and corrosion of any soil, keeps its flexibility from -40° to 375°F. without brittleness or sag. Utility and pipeline companies know they can forget their corrosion worries when their pipe is "Roskoted". Roskote is applied cold, dries fast to save time and is non-toxic. It resists acids, alkalies and moisture—has an electrical resistivity of 20 megohms per square foot.

**For Complete Technical Information and Free Samples Write to:**

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**P. O. BOX 112-C, BLAWNOX, PA.**

# EQUIPMENT MEN . . . in the News

## Knapheide Marks 19th Year With Gardner-Denver Co.

O. C. KNAPHEIDE

O. C. (Butch) Knapheide, Jr., who was recently appointed sales manager of industrial and oil-field divisions of Gardner-Denver Co., Quincy, Ill., has served with the company since 1934. During that time he has become familiar with many of the problems of the petroleum industry, and has had long experience with Gardner-Denver mud pumps and booster compressors, centrifugal pumps, air compressors, and other pneumatic equipment used by exploration, drilling, producing, and refining segments of the industry.

Knapheide joined the Quincy sales force of Gardner-Denver in 1935, and was transferred to the Philadelphia branch office as a field salesman in 1939. In 1940 he held the same position at the Washington, D. C., branch office. In 1945 he returned to the Quincy executive sales office.

In 1949 Knapheide was promoted to sales manager of the industrial division, in charge of pump, compressor, and allied equipment sales. This year, upon the retirement of R. H. Pearson, who was vice president in charge of construction and oil-field divisions, Knapheide was appointed to his present position as sales manager of industrial and oil-field divisions.

## Mid-Continent Establishes Two Locations in Canada

Mid-Continent Supply Co. has opened division offices and is building a new store in the province of Alberta, Canada, President Ken W. Davis announced recently from Fort Worth offices of the organization.

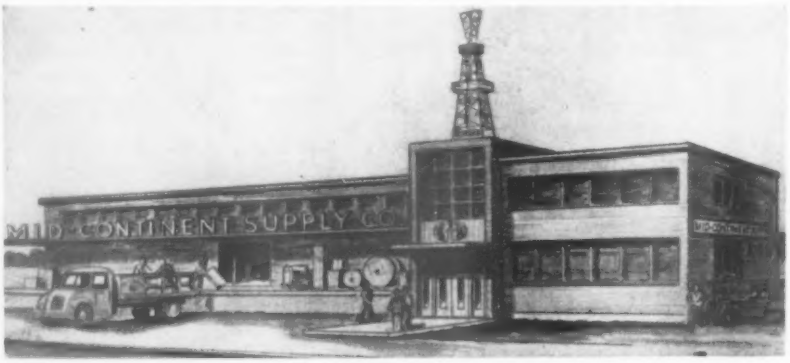
Division offices have been opened in the Blow Building in Calgary. Construction of the new store in Edmonton is under way, with completion scheduled in early August.

Transferred to Calgary as division manager is R. L. Harris. Accompanying him is division machinery manager, G. A. Metz. Manager C. W. Crabtree is in Edmonton supervising construction. All three men were formerly located at Casper, Wyo.

Along with the Alberta move, Mid-Continent has transferred former assistant division manager A. T. Skaer of Tulsa to Denver as division manager. Skaer will have charge of stores and locations in Casper and Thermopolis, Wyo.; Williston, N. D.; Glendive, Mont.; Sterling and Denver, Colo.

The Edmonton store is of masonry construction, designed to afford convenient ground-level sales room and office, joined by truck-level warehouse and dock. The building includes second-floor general business offices.

Reflecting Mid-Continent's modern building design, the Edmonton building will have a brick facade, with Mid-Continent Supply Co. spelled out across the front. Mid-Continent's famous neon oil-spouting derrick, a distinctive feature of all Mid-Continent stores, will be placed on top of the Edmonton store.




Mid-Continent Supply Co.'s new store now under construction at Calgary, Alta., Canada.

## Executive Personnel Changes Announced by Halliburton

Changes in top executive personnel of Halliburton Oil Well Cementing Co. were recently announced by Erle P. Halliburton, chairman and founder. The changes were made at the annual stockholders' and directors' meeting in Dallas.

Logan D. Campbell, vice president and secretary - treasurer, assumes the newly created post of vice chairman of the company, assistant to Erle Halliburton. He was reelected as director.

L. D. CAMPBELL

L. B. MEADERS

R. G. KELLY

M. BRUMMETT

H. H. LEONARD

D. R. YAGER

L. B. (Preach) Meaders, vice president for field operations, succeeds W. R. McClendon, who retired as president after 30 years' association with Erle Halliburton. Meaders was elected a director at the meeting in Dallas.

Taking over Meaders' former post as vice president for field operations is R. G. Kelly, who as a regional vice president supervised the company's operations in the Gulf Coast areas of Texas, Louisiana, Mississippi, and Florida.

Marvin Brummett, assistant general counsel of the company since 1946, was named secretary, and H. H. (Spike) Leonard becomes treasurer and assistant secretary.

One new vice president was named.


WECO...the UNIONS you can trust for Sealing and Service

Selected Raw Materials

Advanced Manufacturing Practices

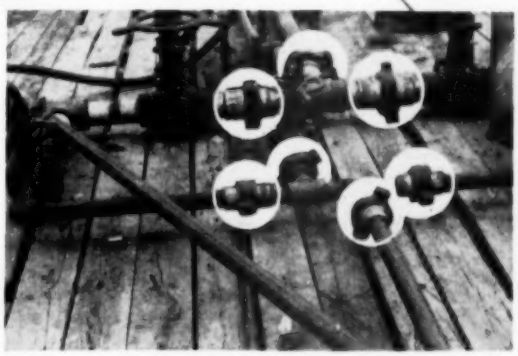
Ball and Cone Seat

Rugged Acme Threads

Heavier Wall Sections

Precision Seating Surfaces

• WECO Fig. 600 Unions on mudline manifold.



Rugged Acme Threads

• It takes a strong, tough union to hold up under the rough services of the oilfields. The wing-nut, especially, takes a severe beating, particularly on lines that are made-up and broken out frequently.

All WECO Unions have strong, rugged Acme threads on the female sub and wing-nut. These threads are precision machined and carefully checked for uniformity and strength. They permit fast, easy make-up, time and time again, without damage or distortion.

The rugged Acme threads are but one of the many quality features we build into WECO Unions to make them the unions you can trust for sealing and service.

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Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

He is D. R. Yager, manager of Halliburton's Oklahoma division, who succeeds Kelly as a regional vice president.

All other officers of the company were reelected. They include: Harry P. Conroy and Fred R. Whitten, regional vice presidents; Ralph R. Emery, vice president for foreign operations and export sales; J. Grover Kilgore, vice president for sales and advertising; W. D. Owsley, vice president for engineering advice to management; Wilfred Tapper, vice president for electrical well services; John P. Harbin, assistant secretary, and G. D. McEnroe, assistant treasurer.

Campbell, financial and tax specialist, has been with Halliburton since 1926. He is a trustee of the Halliburton Employes' Benefit Fund and a director of Halliburton Oil Well Cementing Co., Ltd., the Canadian subsidiary.

Halliburton's new president, Meaders, began his career with the company as a cementing-unit driver in 1928. He is a graduate of Harvard University's advanced management program.

Kelly was employed by Halliburton in 1930 at Odessa, Tex., and has worked in Texas, New Mexico, Louisiana, and Oklahoma.

Brummett has been a Halliburton attorney for 15 years. He is a trustee of the Halliburton Employes' Benefit Fund and organized the company's safety program.

Leonard joined Halliburton in 1934 and was made assistant secretary-treasurer in 1940.

Yager had been manager of Halliburton's Oklahoma division since 1935. He was employed in 1926 and has risen through field assignments in southwestern oil fields.

## Murphy Joins Perrault As Administrative Manager

C. H. MURPHY

R. E. (Bob) Shackleford, general manager of Perrault Equipment Co. in Tulsa, has announced the addition of C. H. Murphy, of St. Joseph, Mo., to the Perrault staff as administrative manager.

Murphy was general manager of a machine shop in Wichita, Kans., from 1949 until 1951 when the shop was bought by Continental Can Co. He continued to work for the new company out of Coffeyville, Kans., until he joined Perrault, suppliers of equipment and materials for pipe-line contractors.

## Koppers Co. Names Robbins To New Engineering Post

Appointment of Fred A. Robbins as chief engineer of piston ring department of Koppers Co., Inc., was announced recently by J. L. Tunstead, general sales manager of the company's metal products division. In this newly created position, Robbins will be in charge of all engineering activities for American hammered industrial piston rings and will work directly with Koppers piston ring customers on engineering problems.

Robbins will work under the direction of John A. Worthington, manager of the piston-ring department, and in cooperation with John W. Pennington, executive engineer of the metal products division, on piston-ring and related product development as well as on design and material standards.

Formerly a consultant to Coordinating Research Council in New York, Robbins directed the analysis during 1953 for full-scale railroad diesel tests. He also served as senior project engineer in diesel-engine development for Electromotive Division of General Motors Corp. in La Grange, Ill., from 1942 to 1952.

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Excessively high replacement costs caused by pipe corrosion disappear when Transite Pressure Pipe is used for salt water disposal. Users everywhere have found Transite Pipe stands up under extremely severe conditions, under the action of salt water on the inside and corrosive soil on the outside.

Transite Pipe's enviable record of long service is traceable to the nature of the product itself. Manufactured by Johns-Manville from asbestos fibres and portland cement, it embodies the toughness and durability of these nonmetallic materials.

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* * *

Transite Pressure Pipe for salt water disposal is made in a wide range of sizes. For further information write to Johns-Manville, Box 60, New York 16, N. Y.

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AN ASBESTOS-CEMENT PRODUCT

## Reed Roller Bit Promotes Wofford, Bourdeau, Thomas

D. F. WOFFORD

Denver F. Wofford has been appointed manager of the Oklahoma sales division of Reed Roller Bit Co., replacing the late E. A. Miller, it has been announced by W. L. Childs, sales manager.

John E. Bourdeau has been named division field engineer for the company and is now responsible for company field engineering activities in the West Texas

J. E. BOURDEAU

D. R. THOMAS

area, according to W. B. Noble, vice president in charge of engineering.

Replaced in the West Texas and New Mexico area by Bourdeau, Reed veteran Sterling Marshall returned to Houston headquarters to assume the duties of product engineer for Reed.

Reed's new division field engineer at Houma, La., will be Dillard R. Thomas who will act as company liaison with drillers in that area.

Wofford joined Reed 17 years ago as a salesman in the Texas Gulf Coast area. He has served with Reed in sales and engineering capacities in Mississippi, Texas, Wyoming, Canada, Venezuela, and Oklahoma, before taking over the duties of Oklahoma sales division manager.

Bourdeau has been with Reed's engineering department since 1947, and prior to his present appointment served as field engineer at Houma, La. His new territory covers Midland, Odessa, San Angelo, and Lubbock, Tex., as well as Hobbs, N. M.

Thomas brings a varied machine shop, sales and engineering background to his new position.

## Shanahan Joins Le Roi's Field Engineering Staff

Frank Shanahan has joined Le Roi Co.'s field engineering staff, according to P. W. Eells, vice president of Le Roi.

Prior to joining Le Roi, Shanahan was chief test engineer of A. O. Smith, has also been associated with Shell Oil Co. His field work for Le Roi will be L.P.G. carburetion division. Shanahan primarily concerned with Le Roi's line of high-powered V-8 transportation engines and heavy-duty oil-well drilling engines, according to Eells.

## Spence Heads Continental Promotion Division

John B. Spence was recently named by The Continental Supply Co., Dallas, to head its advertising and sales promotion division, according to an announcement by J. A. Mussler, general manager of sales. Spence assumes these duties from A. J. Mueller, who has supervised the advertising activities in addition to his work in connection with catalogs and pricing.

In making the announcement, Mussler said: "The increased demands upon our catalog and pricing division required that we relieve Arch Mueller of his added work brought on by his handling of the advertising department. We felt that we should take advantage of his many years of experience in the catalog and pricing division."

Spence joined Continental in the latter part of 1952. His prior experience was in the newspaper field.

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Sometimes, it's better to be a little nuts - like the squirrels . . . They know all about storage, and if you've got a problem in storage for gas, ole "Smoky" Billue has the right deal that saves you time and money.

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SAFE . . . from fire hazard—SAFE . . . from explosions—SAFE . . .from sabotage

LOW INVESTMENT . . . costs less than one-sixth of steel pressure vessels.

ECONOMICALLY SOUND . . . will allow plant to operate at full capacity at all times, thus fully utilizing plant investment.

These reservoirs are in daily commercial use as working storage parallel to, or replacing steel surface storage.

Underground Storage is the only proven system of low enough investment to permit storing L.P.G. during off-market seasons to sell during peak demand and price season.

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# Would you buy a brake that can't be relined?

Rotary hose is a big investment, too. And it's as simple as relining brakes to repair Goodall Long-Life Rotary Hose with the built-in Barney Coupling. The Barney Coupling can be reset in the Goodall repair shop adding extra long life and extra feet of drilling to your hose. Goodall is the only rotary hose with this exclusive money saving feature and is now available through all supply stores with field stocks.

there's a world of difference in rotary hose... and Barney couplings make the difference

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New York, Philadelphia, Pittsburgh, Chicago, Denver, St. Paul, Detroit.
EXPORT: Goodall Rubber Company, Trenton, N. J.
STOCKING DISTRIBUTORS:
Houston Oil Field Material Co., Wilson Supply Co., Iverson Supply Co.

# DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

## TRADE LITERATURE

**1 BAKELITE AND VINYLITE RESIN COATINGS FOR THE PETROLEUM INDUSTRY** is a new eight-page illustrated folder describing advantages and use of synthetic resin-base coatings in the petroleum industry. Case histories, test results, and photographs of actual industrial applications of the finishes are presented. Specific applications described include sucker rods, well-head corrosion, offshore drilling operations, antifouling tests, auxiliary vessels, and mobile field laboratory. *Union Carbide & Carbon Corp.*

**2 UNATTENDED PIPE-LINE STATION CONTROL SYSTEM,** a six-page illustrated data sheet, presents a detailed description of new automatic system which controls operation of unattended pumping stations for transmitting crude or product. Instrumentation, centralized in a single control cabinet, performs four major functions: control of station on the line; start and stop control; station protection, and continuous recording of station performance. Recording instruments log the history of station operations. *The Foxboro Co.*

**3 DITCHER CATALOG.** A new Catalog F-167 showing all nine models of Buckeye ditchers is well illustrated with action photographs, showing the many types and sizes of Buckeye ditchers available, their digging speeds, digging depths, and widths. Also included are data on engines, horsepower, machines weights, and ground bearing pressures. *Gar Wood Industries, Inc.*

**4 THE KETTLEMAN HILLS STORY** is a production history of 158 wells in the Kettleman Hills North Dome field. Study includes all wells which produced for a period of at least 1 year, between April 8, 1943, and May 31, 1951. A careful comparison is made of productivity of these wells, taking into account producing zones, formations, and drilling muds used during completion. Wells drilled with oil-base drilling fluids actually returned $5,500,000 more oil than comparable wells drilled with water-base muds. *Oil Base, Inc.*

**5 YOUNG HEAT TRANSFER NEWS** is the title of a new two-color bimonthly house organ, which discusses engineering information on existing and new installations. Subjects of installations include pictorial and editorial presentation of aeronautical, automotive, oil-field, and chemical process cooling equipment. *Young Radiator Co.*

**6 TYPE 205-B MULTIMATIC ROTARY,** which has built-in, air-actuated slip-operating mechanism and other new features, is presented in a 16-page illustrated brochure. Bulletin describes the equipment, which is designed for any depth drilling, its features, construction details, operations, and specifications. *The National Supply Co.*

**7 SESC BULLETIN** describes line of SESC pumps, which provide an over-all line of centrifugal pumps covering the widest variety of applications and offering maximum interchangeability of parts. Line covers six types of pumps with varieties of mountings, frames, and drives. Bulletin also includes charts to illustrate coverage provided by six types of pumps in SESC line. *Worthington Corp.*

## FOR MORE INFORMATION . . . . use one of these cards

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OIL AND GAS EQUIPMENT Digest CHECK IT

**8 TI TIMEBREAK-COMMUNICATION RADIO** is the first to be designed specifically for the type of service peculiar to reflection seismograph operations. This set is light in weight and rugged in construction. Frequency response below 200 cp. and high signal-to-noise ratio assures reliable transmission of time-break and shot-point seismometer signals, and also provides ever-ready voice communication channel between shooter and observer. *Texas Instruments, Inc.*

**9 "201" ORIFICE METERS.** This comprehensive 28-page bulletin features 3½ pages of tables giving representative orifice capacities — offering the measurement man in the field time-saving help in sizing orifice-meter plates. Full-page front and rear view sectional photographs show construction and operation. New differential controller, designed for orifice-meter measuring stations, is described with the help of cutaway photograph and a diagram showing its use. *Rockwell Manufacturing Co.*

**10 NEW PERFORMANCE IN THE OIL FIELD** is a new two-color market brochure showing various applications of crawler tractors and motor graders with allied attachments, and new rubber-tired motor scrapers recently added to A-C oil-field line. Included also are detail views of A-C equipment and attachments, as well as data on capacity, horsepower, and weight of tractors, graders, and motor wagons. *Allis-Chalmers Manufacturing Co.*

**11 LINC-CONDITIONING PLAN.** Straight-line mass-production techniques and economies are now being applied to the reconditioning and rebuilding of arc-welding equipment. The new plan utilizes conveyor lines and line operations to realize efficiencies in rebuilding welders, work which is normally done on a one-at-a-time basis. *The Lincoln Electric Co.*

**12 WARREN-QUIMBY SCREW PUMP.** This 12-page, 2-color Bulletin S-205 is devoted to standard gear-in-head; high-pressure, long-body gear-in-head; and standard vertical gear-in-head types of pumps. Basic construction and design are discussed in detail and there are sectional views with indicated features; also external and installation illustrations, dimensions, and specifications. *Warren Steam Pump Co., Inc.*

**13 MOTOR-DRIVEN CONTROLLED-VOLUME PUMPS.** This 40-page Bulletin 553 contains information covering design and construction of these pumps. Other technical data include capacity-pressure selection tables; types of capacity adjustments; standard and special designs, as well as packaged systems. A two-page chart describes typical applications in six major industries. Also included is a four-page materials-selection chart in four colors. *Milton Roy Co.*

**14 KOVEN BUILT PROCESS EQUIPMENT.** The design and manufacture of specialized equipment for processing, plant operation, and handling and storing are treated in a new brochure. This brochure describes and illustrates a wide variety of specialized equipment ranging from large installations to component parts, including mixers, pressure vessels, retorts, towers, tanks, stacks, diesel engine parts, and large press bases. *L. O. Koven & Brothers, Inc.*

**15 PRESSURE AND VACUUM GAGES.** A new 32-page Catalog 7001 describes many types of pressure and vacuum gages used to measure vacuums as great as 10-11 mm. of mercury and pressures as high as 150,000 psi. Catalog covers indicators, recorders, pneumatic and electric controllers, and pneumatic transmission. Information is presented in tabular form for ready reference. *Minneapolis-Honeywell Regulator Co.*

**16 AIRCO ON ELECTRODES** is an up-to-date, 50-page pocket guide to Airco electrodes. Over 30 different electrodes; stainless, mild and high-tensile steels, cast iron, nonferrous, low hydrogen, and hardfacing are described as to chemical analysis, procedure for welding, and application. Other sections in the booklet include picking the right electrode, mechanical properties, testing of electrodes, and A.W.S.-A.S.T.M. specifications. *Air Reduction Magnolia Co.*

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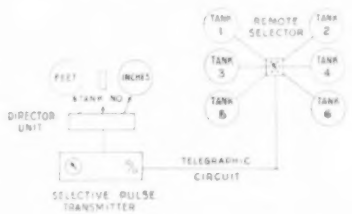
# DIGEST OF NEW EQUIPMENT

IT'S NEW ✓ CHECK IT

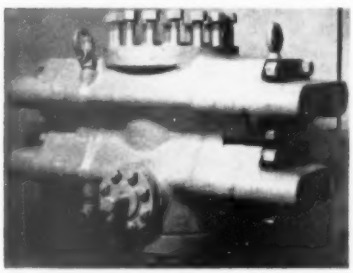
**by Dan B. Miller**

**17 VARIOPLEX REMOTE LEVEL GAGING SYSTEM** brings to industry an accurate method for the selection of any one of a remote group of storage tanks, and the transmission therefrom of level intelligence. Multiple station remote level gaging is made practicable over a single telegraphic circuit. Since the Varioplex utilizes conventional telegraphic techniques, the distance over which remote selection and subsequent transmission of intelligence may be attained is limited only by the signaling capability of the communication link—a capability which may be indefinitely extended by the use of standard telegraphic repeaters. The versatility of this equipment makes its application to other remote-control problems of the industry entirely practicable. *Shand & Jurs Co.*



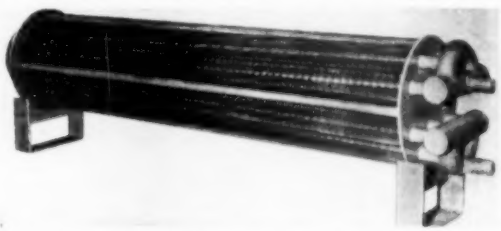

IT'S NEW ✓ CHECK IT

**18 CAMERON TYPE SS PRESSURE-OPERATED BLOWOUT PREVENTER** is designed for use in areas where many drilling rigs employ substructures which have limited space under the derrick floor. Most sizes may be readily lowered to the cellar through the rotary-table opening without disturbing any beams. The type SS blowout preventer provides two sets of rams in a single body. Each set of rams operates entirely independently of the other. Blind rams to effect a shutoff when pipe is out of the hole, or pipe rams to effect a positive seal with pipe in the hole, may be employed in any desired combination. Although pipe rams may be used in both compartments, the vertical spacing is not sufficient to accommodate a coupling or tool joint between the rams when both sets are closed. Pressure operation of the rams, plus the use of pressure to open and close the bonnets for easy ram changing are features included in the new design. A favorable closing ratio (approximately 4:1) assures swift closure of the rams to prevent the well from unloading and the possible loss of control. With the rams in closed position, well pressure is bypassed to the rear side of the rams to aid in maintaining the seal. *Cameron Iron Works, Inc.*



IT'S NEW ✓ CHECK IT

**19 NEW HORIZONTAL CAL-FIN TANK HEATERS** feature the use of helically wound serrated fins which combat laminar flow. The new heaters are available in two basic designs. The series I H heaters are designed for complete submergence in the fluid to be heated and are suggested when more than one heater is required in one tank. The series M H heaters are designed for installation in a manhole. With their wide tube spacing and high-performance fin surface the new heaters require approximately one-eighth as much tubing length as is usually required in plain tube heaters or internal pipe coils. *Drayer-Hanson, Inc.*



IT'S NEW ✓ CHECK IT

**20 NEW REMOTE MINIATURE INDICATOR** is suitable for mounting in either graphic or conventional panels. The miniature indicator has a total scale length of 5¾ in. calibrated from 0 to 100. The scale, mounted on a rotating drum, is positioned by a pneumatic signal from any remotely located primary or secondary instrument. The drum scale rotates just behind a fixed horizontal reference line and can be read with a high precision consistent with the instrument's accuracy of 0.5 per cent of full scale. A useful feature of the indicator is the variety of alarm devices and operating guides that can be incorporated into the instrument. Combinations of visual and audi-

KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.

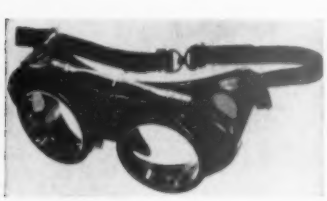
ble alarms are available to keep a continuous check on the measured variable and warn the operator when the variable is outside required operating limits. The various warning arrangements are: a continuous strip having four distinctive widths that correspond to successive 25-unit segments of the scale; adjustable color guides to indicate over and underrange readings; automatic alarm contacts that, in addition to the color guides, warn of over and underrange readings. Both the indicating color guides and the alarm contacts can be quickly and accurately reset to monitor any scale portions desired without actually operating the system or pressuring the indicator. *Fischer & Porter Co.*

IT'S NEW CHECK IT

**21 REFRACT-O-RITE GUN** for use in connection with the pneumatic emplacement of castable refractory products, is a new innovation in the field of shooting materials in place rather than pouring or trowelling. With the Refract-O-Rite gun the correct amount of water is added in the mixing chamber, and the aggregates in the materials remain in proper balance and suspension as the mixture is conveyed through the hose and sprayed, with proper air velocity, to the target. Rebound loss is reduced to less than 5 per cent. Finger-tip density control is easily regulated by increasing or decreasing air pressure at the nozzle. Refractory materials may be applied with a dense, abrasion-resisting mass, or an open, porous-type, insulating body. In either case a well-bonded texture, uniform and strong, homogeneous structure is obtained. *Mexico Refractories Co.*

IT'S NEW CHECK IT

**22 NEW GOGGLE FOR WEAR OVER PRESCRIPTION GLASSES** provides a comfortable fit with ample clearance over modern, large-frame prescription glasses. Two versions are offered: a chipping style, with clear, heat-treated glass lenses; and a welding goggle, with choice of filter lens shades. Molded nylon eye cups are a feature of the new goggle. Nylon gives the user these important advantages: light weight, toughness, nonflammability, and low conductivity of heat. Standard 50 mm. round lenses are used in both chipping and welding versions, eliminating the need for users stocking odd-size replacement lenses. External lens retaining rings make lens replacement quick and easy. A rigid metal top bar is standard. This provides an adjustment to the individual user's face, and also makes the goggle easy to take off and on with one hand. Two-piece adjustable headband and leather nose-and-bridge curtain also contribute to more comfortable fit. Two-way ventilation is provided through slots in the lens-retaining rings, and screens in eye cups. *Willson Products, Inc.*



IT'S NEW CHECK IT

**23 REED TOOL JOINTS AVAILABLE FLASH WELDED TO DRILL PIPE.** Full-hole, semiinternal flush, and internal flush types are available, with either the conventional square shoulder or with 18° taper. All Reed tool joints have prelubrication infused into the threads to prevent galling. Reedite, a tungsten carbide facing material, may be had upon request. Centering and holding devices keep the drill pipe and tool joint (pin and box) in accurate alignment. This is extremely important, as the whip in a misaligned drilling string is both costly and dangerous. *Reed Roller Bit Co.*

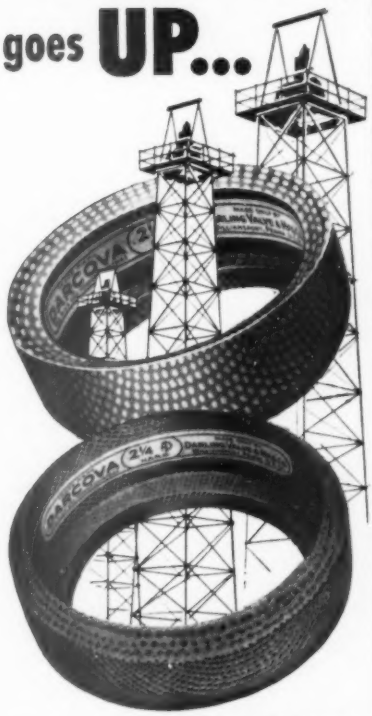
IT'S NEW CHECK IT

**24 NICOLET VITRABESTOS** is a glass scrim reinforced asbestos pipe-line felt with the reinforcing in both directions of the felt on ½-in. spacing. This longitudinal and transverse reinforcing provides twined drawn glass reinforcement which makes a stronger felt in all ways. The product is available saturated with either tar or asphalt. The scrim is used in conjunction with long-fiber asbestos. Its advantages include greater application strength; it does not break or tear. The scrim reinforcing is surrounded by enamel plus the usual shielding effect of the asbestos felt. Coating and wrapping-machine brakes can be set as tight as desired and gases will escape freely through the Vitrabestos. *Middle West Coating & Supply Co.*

IT'S NEW CHECK IT

**25 NEW FISHING TOOL.** The tool itself is simple in design and operation. The body (2) has a tool-joint connection (1) in top which is threaded and locked (6-6A) to the safety joint (7). Inside the safety joint is a packoff (8) to force circulation through fish when desired. The mandrel or stem (3) which works through the safety joint has a male clutch (5) on the upper end, to companion with the female clutch (5A) for backing off or releasing tool from fish. On the lower end is a left-hand male thread (11) onto which the tool-joint pin (13) is made up. The circulating ports (9) permit circulation through the wash

## Pumping Efficiency goes UP...



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***No need to pull the well so often!*** Darcovas' precise control of all materials and processes from lab to well means exceptional resistance to wear and deterioration . . . Different textures, scientifically developed and controlled, are fully proved to give peak efficiency and longer flex-life at any depth! Precisely controlled sizes for any make or size pump increase efficiency.

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THE ORIGINAL COMPOSITION CUP

## for heavy duty pumping service you can't beat LORAIN ENGINES

Regardless of climatic conditions—in hot or cold weather—Lorain Engines give you easy-starting, low-cost pumping power on gas or diesel fuel.

Their day-in and day-out dependability and lower maintenance cost is based upon sound, rugged design and precision construction. Hefty roller bearings throughout, thermo-syphon cooling, removable wet cylinder liner—means Lorain Multi-Fuel Engines take the toughest pumping jobs in stride.

Ranging from 20 to 60 horsepower, there's a Lorain Engine to fit *your* pumping job. Just contact your nearest Oilwell Supply man for full details on Lorain Engines—the engines designed for heavy duty service. You can't beat them for keeping pumping cost low.

A 6810

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**WHITE-ROTH** *Machine Corp.* LORAIN, OHIO

pipe. The clutch (10-10A) is the makeup clutch. The tool is run on top of the wash pipe in the same manner as a washover safety joint. When washover is completed the tool is attached to the fish by screwing into tool joint or by means of spear, overshot, or tap. Each tool is constructed with sufficient tensile and torsional strength to withstand

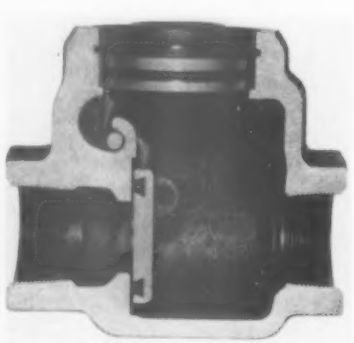
any force that may be applied with the drill pipe on which it is designed to run. There is 5 ft. of free working space in the tool allowing the wash pipe to be kept in motion while running a free point indicator or backoff shot in the hole. When the backoff shot is at the desired depth the wash pipe is picked up enough to engage clutch, reverse torque is applied, and backoff is made in usual manner. *Tri-State Oil Tool C.*

IT'S NEW CHECK IT

**26** **TRIANGLE SEMIRIGID PLASTIC PIPE** is made of Butyrate. It is available in ½ through 6-in. in 20-ft. lengths with one coupling cemented. This type is flexible enough to follow ditching contours yet its impact strength eliminates special care in backfilling. It finds its best applications in the petroleum industry as it is not affected by paraffin crudes, raw gas, sour crudes, or brine. Its chemical resistance and its resistance to rust, rot, and electrolytic action also makes it acceptable for jet wells, chemical piping, and gas service entrance lines. *Triangle Conduit & Cable Co.*

IT'S NEW CHECK IT

**27** **IMPROVED SWING CHECK VALVES.** The new Streamflo synthetic-seal check valve, which weighs 50 per cent less, is full pipe opening allowing ample scraper room. A new feature is the O-ring-sealed bonnet, secured by a snap ring. There is no pin through the body for the clapper linkage, eliminating possible leakage. Removing the bonnet automatically releases the clapper for quick inspection. In addition, the seal, dovetailed into the clapper, gives a positive seal on only 1 psi. pressure differential. One line in cast iron handles pressures up to 300 psi. and the other in steel handles pressures from 300 to 1,200 lb. Both the steel and cast-iron valves are made in screwed and flanged ends and a special valve in steel has beveled ends to permit welding directly into the line or for welding neck flanges. *Charles Wheatley Co.*

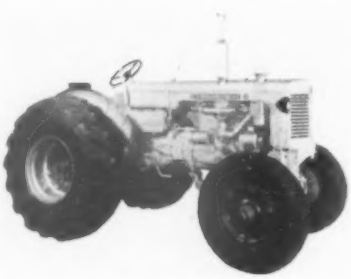


IT'S NEW CHECK IT

**28** **HEMCO-MOTIVE** a roadable switch engine solves the problems of switching and spotting railroad tank cars. The hydraulic weight transfer cylinder transfers the cars weight onto HemcO-Motive, thus giving switch engine the necessary traction to pull the load. The unit is conveniently flexible, due to its combination rail and ground operation. It can move cars from either side, with ample visibility for the operator to see the full length of his train. It develops a draw bar pull of 7,400 lb. which under average conditions is sufficient to propel three fully loaded cars, or six to eight empties. It moves the cars at a speed of 150 ft. a minute and moves at a speed of 8 to 10 m.p.h. on the rubber tires. *Hemco Manufacturing Inc.*

IT'S NEW CHECK IT

**29** **UTIL INDUSTRIAL WHEELERS** are produced with improved features and a wider selection of optional equipment. Hydraulic steering equipment has a control valve in the drag link to permit mechanical steering in the event of hydraulic failure, and a relief valve in the pump to eliminate high back pressure when wheels are turned to the limit. A new 283-cu. in. diesel has been introduced for the UTIL. This diesel engine is completely interchangeable with the gasoline engine and is built on the Lanova energy call principle. Removable fuel nozzles provide easy service. Latest type Bosch single plunger injection pump and three-stage fuel filter provide dependable operation. Other current improvements are 6.35:1 compression ratio on the high-turbulence gasoline engine. Left and right wheel brakes can be controlled singly or together, by new large pedal pads. Front-wheel tread is increased 4 in. for greater stability. *Minneapolis-Moline Co.*



IT'S NEW CHECK IT

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Here are some examples of the results of Sandfrac treatments performed by Dowell:

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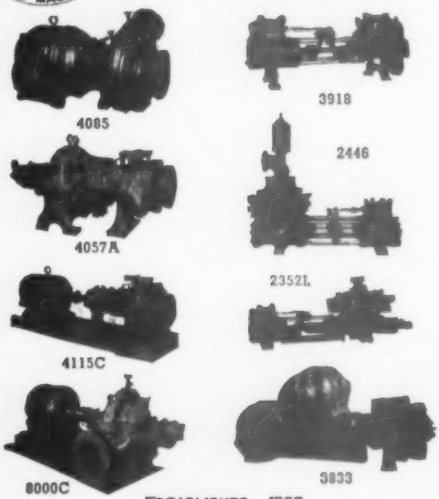


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# PIPE LINES

## Service's North Dakota Crude Line Reaches Missouri River

TIOGA, N. D.—Construction work last week reached the Missouri River about 10 miles south of here on the 154-mile crude-oil line of Service Pipe Line Co. from Tioga to Mandan, N. D.

Crews of O. R. Burden Construction Corp., Tulsa, contractor for Service, last week completed welding of 28.5 miles of 12-in. main line. Lowering-in and backfilling of this segment is under way.

Construction headquarters has been moved from Ray to Watford City in McKenzie County, south of here where crews have resumed ditching and welding operations for the remainder of the 57.2 miles of 12-in. At present, construction operations are now between the Missouri and Little Missouri rivers.

In August, Burden will start work on two river crossings beneath these two rivers. Work on the 93 miles of 16-in. line will start in September from a point east of Dunn Center. There will be 4 miles of river crossings.

C. M. Scott, general manager at Tulsa for Service, said that the project would be completed in December of this year. J. H. Keyes, Jr., Service Pipe Line Co. area engineer at Casper, Wyo., is in charge of company construction with headquarters at Tioga.

Initial capacity of the line will be 30,000 bbl. per day. With addition of pumping facilities, capacity can be increased to 100,000 bbl. per day. The line will transport crude gathered from Tioga and Beaver Lodge fields for delivery to the Mandan refinery of Standard Oil Co. (Ind.) now under construction.

## Four Columbia Subsidiaries Plan Natural-Gas Lines

WASHINGTON.—Four Columbia Gas System, Inc., subsidiaries have filed applications with the Federal Power Commission seeking authority to construct and operate 233 miles of natural-gas lines in Kentucky, Ohio, and West Virginia.

The applications were filed following an FPC order issued in May which authorized Gulf Interstate Gas Co., Houston, to construct an 860-mile line from Louisiana to northeastern Kentucky. The order provided that United Fuel Gas Co., a Columbia subsidiary, would purchase and own all the gas, and it and any other Columbia companies needing additional facilities to transport the some 300,000,000 cu. ft. of gas daily would have to file applications before July 15.

United Fuel and Central Kentucky Natural Gas Co., both of Charleston, W. Va., filed a joint application while separate ones were filed by Manufacturers Light & Heat Co., Pittsburgh, and Ohio Fuel Gas Co., Columbus.

In the joint application the two companies are requesting permission to build about 92 miles of line and construct a 6,000-hp. compressor station near Kenova, W. Va. Plans call for

ON A HILL-TOP overlooking the Missouri River in North Dakota, a field crew of O. R. Burden Construction Corp. lowers in 12-in. pipe on the 154-mile crude-oil line of Service Pipe Line Co. from Tioga to Mandan, N. D.


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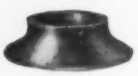

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construction of a 60-mile, 30-in. line from Putnam County, West Virginia, to Gulf Interstate's system in Boyd County, Kentucky.

Ohio Fuel proposes to lay 69 miles of 20 and 24-in. pipe in Licking and Fairfield counties, Ohio. In addition the company plans to install two 1,500-hp. compressor units in its Crawford, Ohio, compressor station.

Manufacturers' proposed project calls for 72 miles of 16 and 20-in. line in Doddridge, Wetzel, and Marshall counties, West Virginia. In the latter two counties it plans to activate Victory storage field and build a 1,760-hp. compressor station.

The combined projects of the four companies will cost an estimated $18,971,914.

## Colorado Interstate to Hike Capacity by 82,500 M.c.f.

WASHINGTON.—The Federal Power Commission has approved one of two applications by Colorado Interstate Gas Co. to expand its natural-gas-transmission system.

The company has received permission to construct line facilities in Colorado, Oklahoma, Texas, and Kansas which will increase sales capacity of its Rocky Mountain system by 82,500,000 cu. ft. daily. Its present daily capacity is 426,300,000 cu. ft.

The project, which will cost approximately $19,856,596, includes 49 miles of 20-in. main-line loop and the addition of 18,920 hp. at new or existing compressor stations. Also, the construction program calls for 35 miles of 12 and 16-in. pipe with 5,940 hp. in supply facilities, 37 miles of 8 and 16-in. sales laterals, and about 112 miles of 4 to 20-in. field lines.

The approved application was submitted by Colorado Interstate in March along with another application seeking authority to construct a 365-mile, 22-in. line from a connection near Green River, Wyo., to Denver. This project would also include construction of a 5,500-hp. compressor station at Green River and necessary metering and regulating facilities. Total cost would be about $23,298,653 *(The Oil and Gas Journal, March 23, page 381).*

## Phillips Begins New Line

ODESSA, Tex.—Phillips Petroleum Corp. has started construction on a 26-mile, 6-in. crude line from its Fullerton field gasoline plant to the company's production east of Andrews.

The project, which is being handled by Moore Construction Co. of Odessa, is expected to be completed by mid-August.

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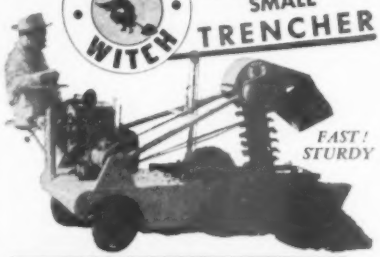

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UP-TO-DATE PIPE LINE MAPS

"JACOBSON'S MAP SHOWING CRUDE OIL AND GASOLINE PIPE LINES OF THE UNITED STATES"

SHOWS: Crude oil pipe lines in blue—gasoline pipe lines in red—key refineries with capacity barrels crude oil per day—principal cities and towns. Pipe lines are indicated with dashes, dots and straight lines so that it is possible to trace individual pipe line systems. Pipe sizes are shown on pipe lines in Rocky Mountain area.
Size 54" x 76". Scale 1"=40 miles.

"JACOBSON'S MAP SHOWING NATURAL GAS PIPE LINES OF THE UNITED STATES"

SHOWS: Natural gas pipe lines are indicated with dashes, dots and straight lines so that it is possible to trace individual pipe line systems—major gas fields are shown in solid red and general gas areas are outlined in red—principal cities and towns.
Size 54" x 76". Scale 1"=40 miles.

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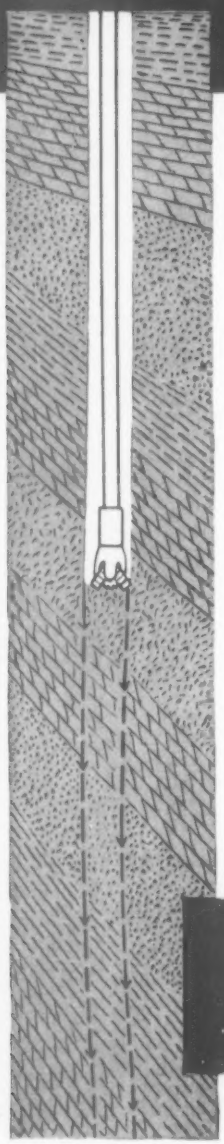
# "Straight" hole going off vertical? Too *much* angle in your directional well?

## Breaking the angle is easy with this NEW "Shoulder" Bit!



## here's how:

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**B** ... with light weight on the bit

**C** ... and high rotary speed

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*Here's how the new "shoulder" bit works.* Two exclusive features do the trick — extra clearance of the body above the gauge cutters, and the straight-across angle of the gauge cutter teeth (see the arrows). This flat contact on bottom quickly forms a new profile on the low side of the hole — the extra clearance between body and cutters insures against deflection toward the old axis of the hole. The combination breaks the angle easily and gradually — result, hole back on its intended course.

The new "shoulder" bits have given good results both in straight holes which have established an increasing angle, and in directional wells where the deviation has exceeded the planned angle. Available in sizes 8⅜ to 12¼". Sizes 8⅜ - 9⅞ are supplied only with 4½" A.P.I. pin. This bit is recommended *only* for use with light weight.

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# Among the Drilling Contractors

## Adequate Safety Cables Prevent Tong Accidents

Provision of adequate safety cables and anchorage for tongs, and frequent inspection of this equipment are safety requisites on any rig floor, according to the latest safety bulletin issued under the auspices of the American Association of Oilwell Drilling Contractors.

The bulletin calls attention to the many injuries, some fatal, which have occurred on rig floors by drilling personnel being hit by tongs rotating around the drill pipe, and which are caused by failure of safety cables, or their fastenings.

Tongs should be equipped, the bulletin cautions, with two 5/8-in. safety cables fastened at each end with three clamps without half-hitch, and suitably anchored in a secure and reliable manner.

A supply of clamps and some extra cable should be kept at the rig, the bulletin adds, so that there will be no excuse for using the wrong size or allowing the tong cables to stay on too long. Superintendents, tool pushers, and drillers are urged to instruct their men properly in their duties, and to make sure the required safety equipment is being used and replacements are available.

**Carter-Jones Drilling Co.** is starting work on a new contract with Bobby Manziel calling for a 6,700-ft. test in the Carthage field area of Panola County, East Texas. Location of the new test, 1 Loeffler unit, is 13 miles southeast of the city of Carthage in the H. McKelvey Survey.

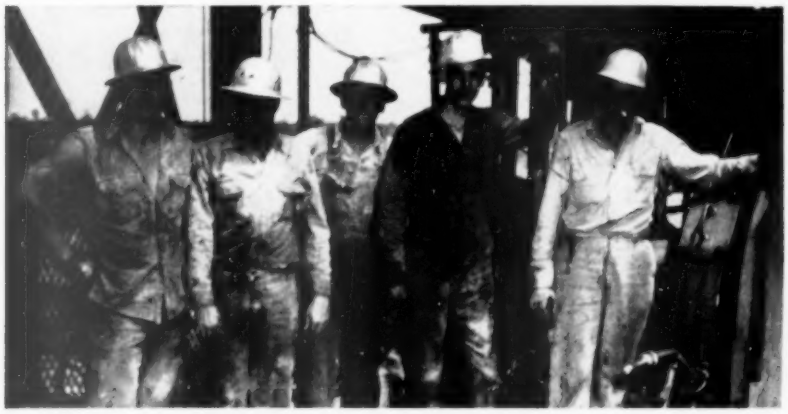
## CORRECTION

In a news account appearing on this page in the June 22 issue of The Oil and Gas Journal, Pontiac Petroleum, Ltd., Wichita Falls, Tex., a newly formed drilling company, was erroneously credited with being a subsidiary of Pontiac Refining Corp. of Corpus Christi.

The two companies have no connection. Pontiac Refining Corp., for many years has operated a refinery at Corpus Christi. Pontiac Petroleum, Ltd., was organized recently to do exploratory drilling for New Continental Oil Co., Ltd., of Calgary, Alta., on a large concession the latter has obtained in Israel.

**H. L. Bedwell** is contractor on a projected 4,000-ft. wildcat test located 3 miles northeast of Rio Grande City, in Starr County, in the Texas Rio Grande Valley. Operators are John J. Pichinson and Thelma Parr, of Corpus Christi. The test, 1 Davis, is in Lot 6, Share 78, Porcion 81.

**Crow Drilling Co.** has contracted with Ohio Oil Co. for another test to be drilled in the new Maxie area of Forrest County, Mississippi. The new test, 1-T Unit SE-43, will be at a location 1½ miles southeast of production. The contractor plans to use the rig



Day-tour crew on deep-drilling rotary rig BBM Drilling Co., Houston, is operating in the Old Ocean field, in Brazoria County, Texas Gulf Coast. Left to right: L. E. Mariner, P. C. Owens, E. R. Baker, C. W. Hazelwood, and W. F. Dillenback (driller). (Picture by courtesy Mission Manufacturing Co., Houston).

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now drilling for Ohio at another Maxie well, 1-T Unit, SE 11. Hole is projected to 9,000 ft.

**Delta Gulf Drilling Co.,** Tyler, Tex., has contracted with California Co. for an 8,000-ft. test to be drilled on the southwest flank of the old Lockport field, southwest of Lake Charles, in Calcasieu Parish, Coastal Louisiana. The location, designated as 1 Farquhar, is about ½ mile from production.

**Circle Drilling Co.,** Lake Charles, La., will do the drilling on an 8,000-ft. wildcat test Curtis Hankamer of Houston has projected for the South Bancroft area in Beauregard Parish, South Louisiana. Location is for 1 Lutcher-Moore, in 25-6s-13w. It is 1½ miles from production.

**Prince Drilling Co.,** Houston, is starting a 13,000-ft. test for Lloyd H. Smith, Inc., and associates at a wildcat location, 1 Kate Hurta Unit, 5 miles south of Francitas, in Jackson County, South Texas. Location is in the Patrick Green Survey.

**Sunnyland Contracting Co.,** Rayne, La., has set up for a 6,800-ft. test it has contracted to drill for John S. Callon of Natchez, Miss., at an outpost location ¾ mile west of the Wayside field, and also about a mile north of the North Kingston field, in Adams County, western Mississippi. Location is for 1 Longmire, in 11-5n-2w.

**Penrod Drilling Co.,** Shreveport, is starting another basal Glen Rose well for Gulf Refining Co. in the Chaparral (Hiwanee) field, Wayne County, Mississippi. The new well is 1 Crow Unit, located in 18-10n-6w. Prospective pay zone is around 9,700 ft. This field has the state's only lower Cretaceous production.

### ACTIVE ROTARY RIGS*

| Area— | Week ended 7-13-53 | Change week ended 7-6-53 | Change week ended 7-14-52 |
|---|---|---|---|
| Gulf Coast | 552 | —40 | —12 |
| N. & W. Tex.-N. M. | 830 | — 9 | 0 |
| Ark.-N. La.-E. Tex. | 152 | — 7 | + 8 |
| Oklahoma | 335 | — 7 | +47 |
| Kansas-S. Nebraska | 162 | —14 | +12 |
| Illinois-Eastern | 141 | — 7 | —14 |
| Rocky Mountains | 272 | + 3 | +35 |
| Pacific Coast | 171 | + 1 | + 9 |
| Total U. S. | 2,615 | —80 | +85 |
| Western Canada | 155 | — 1 | —15 |
| Total | 2,770 | —81 | +70 |

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and western Canada, Pacific Coast, and Illinois-Eastern areas are shown on pages 191 and 192.


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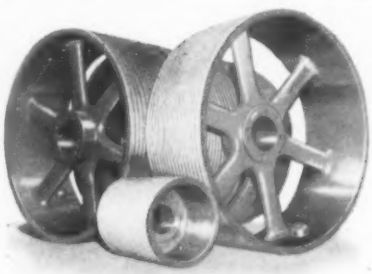

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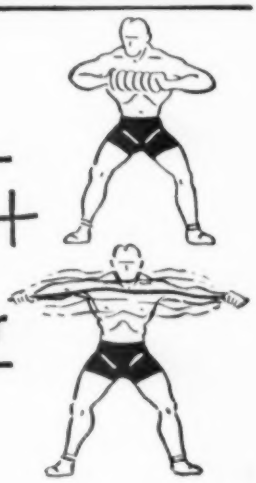

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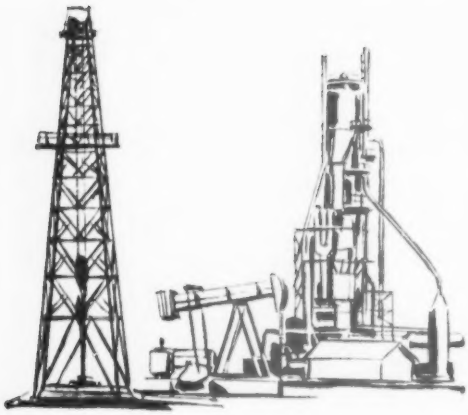

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# NATURAL GAS

## El Paso to Buy Johnston's San Juan Basin Gas Rights

HOUSTON.—Johnston Oil & Gas Co. here has agreed to sell gas rights on about 26,408 acres in New Mexico to El Paso Natural Gas Co.

The agreement covers land in the Rincon unit and areas in San Juan field, Rio Arriba County. However, it was pointed out that the sale is only on gas rights through the Mesaverde formation, and Johnston will retain deep gas rights and all oil rights.

Also, Johnston will reserve an overriding royalty of 5 to 10 cents per M.c.f. on all gas produced by El Paso during the first 15 years after the sale. Thereafter Johnston will receive a minimum of 10 cents per M.c.f. In addition, the Houston firm will get one-third of the royalty on all gas liquids produced.

The actual sale will not take place until January 3. Johnston plans to continue its drilling program and on the closing date will be paid for all wells then drilled on the land being sold.

Recently Johnston announced a drilling program in which it planned to drill nine wells in the San Juan basin. It was estimated that the company's net gas reserves in the area totaled more than 265 billion cubic feet. As of May 1, the company had an interest in 14 wells. *(The Oil and Gas Journal, June 8, page 157.)*

## Late Reports, No Allowable, Railroad Commission Warns

AUSTIN. — The Texas Railroad Commission has issued a memorandum advising all operators in prorated gas fields that if they fail to submit to the commission all required reports, allowables on the wells will be severed.

In its memorandum, the commission pointed out that "numerous reports for wells that are due annually or semi-annually have been delinquent so that the allowables assigned to the remaining wells on the regular schedule are greater than would normally be assigned had all reports been received at the appointed time." Also, the commission stated supplemental allowables on the wells for which reports were received late are greater than normal.

To combat this situation the commission has established a policy by which wells having delinquent reports will not receive allowables "until one month following the date the reports become effective." For instance if reports due May 1 and effective June 1 are filed late between those two dates and after the June schedule is calculated, then the wells will receive no allowable until July 1. If reports are due May 1 but received after June 1 and before July 1, these wells will receive no allowable until August 1.

## Terms of Hugoton Gathering Properties Sales Revealed

OMAHA.—Northern Natural Gas Co. has disclosed details of its recent purchase of Republic Natural Gas Co.'s natural-gas-gathering properties in the Kansas portion of Hugoton field.

The properties include Republic's "A" and "B" systems which are connected to 212 wells in that area. Purchase price to be paid by Northern for the system is $3,415,839.

It was also agreed that Northern will now take deliveries of gas from Republic at the well head instead of at a central delivery point as has been done in the past.

The two gathering systems include a total of 275.07 miles of 3 to 20-in. pipe and measuring facilities.

## Equitable Plans Development Of Logansport Storage Field

PITTSBURGH.—Equitable Gas Co. here has announced plans to develop the Logansport storage field in Marion County, West Virginia.

The field is located in the Big Injun sand in Mannington district. The company proposes to construct a 1,320-hp. compressor station in Wetzel County, West Virginia, and connect it with the storage pool via a 9-mile pipe line.

The entire project will cost $2,-217,400.

## Gas Sales Increase in May

NEW YORK. — Natural-gas sales during May totaled 4,017 million therms, an increase of 17.6 per cent over sales of 3,416 million therms in the same month last year, the American Gas Association reports.

For the 12-month period ending May 31 sales amounted to 51,122 million therms, a gain of 9.8 per cent over the 46,543 million therms sold in the preceding 12-month period. The index for May was 179.3 per cent of the 1947-49 average.

## Storage Project Approved

AUSTIN.—Lone Star Gas Co.'s application to store gas in Flippen limestone reservoir of View field, Taylor County, Texas, has been approved by the Texas Railroad Commission.

The company plans to inject about 6,000,000 cu. ft. daily through four of the 19 oil and gas wells in the shallow west central Texas field.

## Centennial Celebration Plan

SAN FRANCISCO. — The Pacific Coast Gas Association at its annual meeting here September 9-11 will celebrate a century of gas service in San Francisco and also the association's sixtieth anniversary.

In keeping with the occasion Nob Hill again will have gas street lights. At dusk each evening of the meeting, a lamplighter will make his rounds to light gas lamps in front of the Fairmont and Mark Hopkins hotels, convention headquarters.

# Natural Gasoline

## Ellis Transport Receives Permission to Store L.P.G.

AUSTIN. — The Texas Railroad Commission has granted Ellis Transport Corp. permission to carry out a L.P.G. storage project in South Texas.

The company plans to store about 16,000,000 gal. in an injection well in Section 52, A-884, Hamilton Survey, Harris County. Plans call for leaching out a cavity between 1,200 and 1,300 ft.

Also, the commission has been requested by Stanolind Oil & Gas Co. to be permitted to store L.P.G. underground in Labours 14 and 15, League 49, Scurry County School Land Survey, Slaughter field, Hockley County. The company plans to wash out a cavity with fresh water from its Slaughter plant in salt sections with a capacity of 100,000 bbl. The salt section is from 2,300 to 2,800 ft.

## Cycling Plant Proposed

BATON ROUGE.—A proposal to construct a cycling plant in Krotz Springs field, Landry Parish, will be given a public hearing by the Louisiana Department of Conservation soon.

The project is to bolster production in the area and make it available for industries here.

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# REFINING

## Marketing of TCP Gasoline Hastened by Shell Oil

NEW YORK.—Shell Oil Co. is planning immediate nationwide distribution of its new premium TCP gasoline, which had been originally scheduled for marketing in late August.

Company officials report that the stepped-up program is due mainly to favorable results from tests conducted recently in 16 cities where adequate blending facilities were available.

The new gasoline contains the additive tricresyl phosphate which suppresses laying down of carbonaceous deposits in engines and in some cases removes deposits already formed. It is considered by Shell as an important step in combating preignition and other combustion difficulties encountered in high-compression engines. TCP originally was developed for use in military and commercial aircraft.

## Revenue From Oil Taxes To Be Larger This Year

WASHINGTON.—Treasury revenue from the four federal oil taxes for the fiscal year 1953 is expected to run close to $200,000,000 above that of the preceding 12-month period.

The Internal Revenue Bureau's report for May shows that collections in the first 11 months of the year, which ended June 30, ran $175,578,000 ahead of the corresponding period the year before for gasoline, $7,879,000 ahead for diesel oil, and $877,889 ahead for pipe-line transportation. However, a loss of $16,676,000 for lubricating oils was recorded.

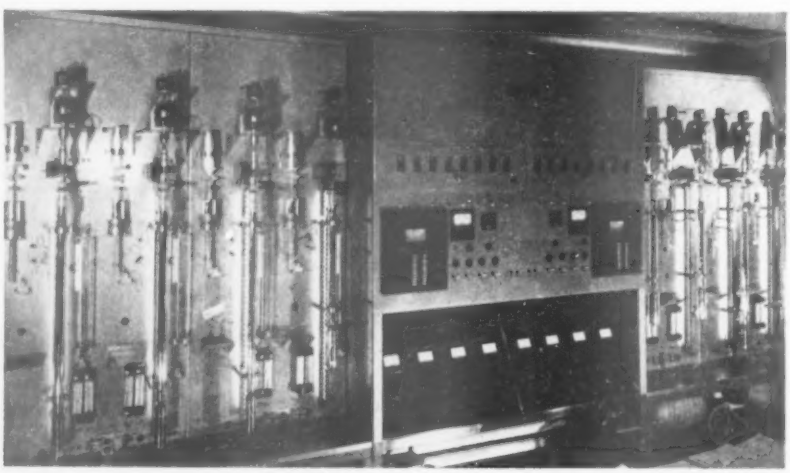
Collections for the month of May alone were ahead of May 1952 in all categories, except pipe lines. Reports have shown gasoline returning $74,158,118 against; $58,622,886, lubricating oils $6,818,579 against $5,406,817, pipe-line transportation $2,299,463 against $2,506,801, and diesel oil $1,217,509 against $1,069,245.

For the 11 months ended with May the treasury secured $817,008,782 from gasoline against $641,430,698 a year ago, $67,233,318 from lubricating oils against $83,909,749, $25,623,552 from pipe-line transportation against $24,745,663, and $15,866,257 from diesel oil against $5,986,870.

## Jet-Fuel Contract Awarded

WASHINGTON.—One of the largest jet fuel contracts issued by the Government has been awarded Macmillan Petroleum Corp., Los Angeles, according to the Armed Services Petroleum Purchasing Agency.

Immediately after receiving the contract, which totaled $2,493,750, Macmillan's Signal Hill, Calif., refinery began deliveries. The company has held several smaller jet-fuel contracts during the past 2 years.



## New Equipment Aids Research

**This battery of eight miniature stills and a larger still is being used by scientists at the Whiting, Ind., laboratories of Standard Oil Co. (Ind.) to study liquids produced in research such as aviation gasoline, synthetic lubricants and detergents, plastics and plasticizers, and petrochemicals. Company officials report that the equipment has not only been invaluable in the search for new and better products but has aided in expanding knowledge about distillation and refinery design.**

## Refining Briefs

**EVERETT, Mass. — Esso Standard** Oil Co. has installed the world's largest totally enclosed gas-filled induction motor at its 50,000-bbl. per day refinery here. The 14-ton giant, which was built by General Electric Co.'s Medium Induction Motor Department at Schenectady, N. Y., is rated at 3,000 hp., 1,800 r.p.m., 2,300-volt, 3 phase, and is used to power a centrifugal compressor.

**TEXAS CITY.—A new laboratory** for conducting research with radioactive materials has been completed by Pan American Refining Corp. here. Assigned to the laboratory are Dr. R. J. Lee and H. H. Hamnen of the research division.

**SAN FRANCISCO. — Employes of** Standard Oil Co. of California's Richmond refinery have set a West Coast refinery safety record of 3,000,000 man-hours without a lost-time accident. The refinery's previous safety record was 2,753,310 man-hours without a lost-time mishap.

**PRINCETON, Ind.—R. J. Oil & Refining Co., Inc.,** is installing a Platforming unit at its 1,500-bbl. per day refinery here. Construction, which is being handled by Procon, Inc., of Des Plaines, Ill., is expected to be completed in early August.

## Petrochemicals

### Great Southern's Texas Plant Nears Completion

CORPUS CHRISTI.—Great Southern Chemical Corp.'s new $5,800,000 benzene-toluene-xylene plant is expected to go into operation here early this fall.

The expansion program being carried on by the company involves construction of an entirely new plant with different raw-material sources and product markets from the present butylene plant. The latter was reactivated by Great Southern Chemical in 1951.

Benzene, toluene, and xylene will be derived from natural gasoline which will be purchased from several plants in the coastal area. Design calls for a daily intake of 10,000 bbl. of raw material. The Platforming and Udex units were designed by Universal Oil Products Corp., and will utilize processes created by U.O.P.

Once aromatics are taken from the gasoline, remaining fuel will be moved on to nearby refineries as run stock. Gasoline is to be piped into the plant from as far away as the La Gloria cycling plant at Falfurrias, Tex. Liquid aromatics will be shipped out by barge, with the larger amount going to petrochemical plants on the Gulf Coast.

Procon, Inc., of Chicago, is contractor for engineering and construction of the process units. Construction work was begun in October and is now about three-quarters completed. Offsite work, including erection of tankage, boilers, and other vesseles, has moved ahead on schedule and is expected to be completed to coincide with completion of the process units.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Reda Pumps are accepted as original equipment, or replacement equipment, because they produce at a lower cost per barrel of fluid. Whether it's large volumes from shallow depths, or modest volumes from great depths, Reda Pumps provide operating savings.

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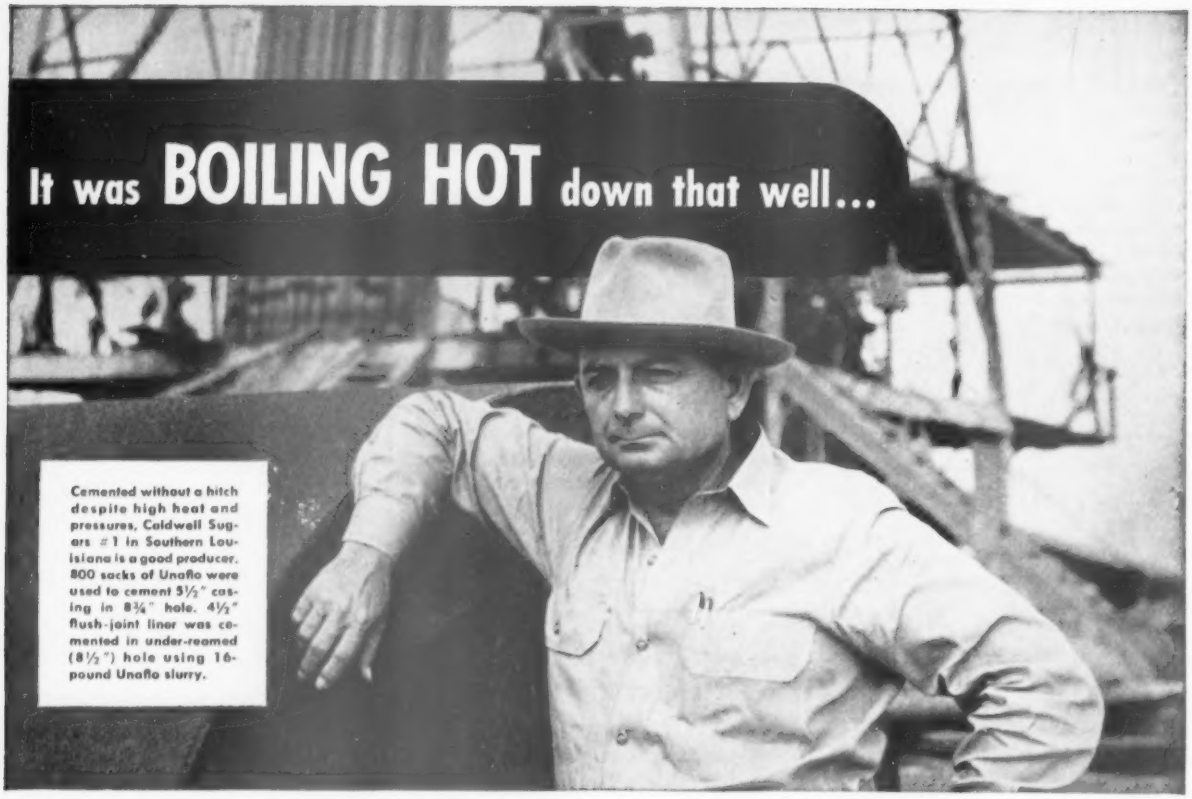
It was BOILING HOT down that well...
Cemented without a hitch despite high heat and pressures, Caldwell Sugars #1 in Southern Louisiana is a good producer. 800 sacks of Unaflo were used to cement 5½" casing in 8¾" hole. 4½" flush-joint liner was cemented in under-reamed (8½") hole using 16-pound Unaflo slurry.

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*"UNAFLO" is the registered trade mark of the retarded oil-well cement manufactured by Universal Atlas Cement Company

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*Resistant to Sulfate Waters*
**Atlas Portland Cement—Type I**

**Atlas Portland Cement—Type II**
*Resistant to Sulfate Waters*
**Atlas High-Early Cement—Type III**

OG-U-128-R

# EXPLORATION

## Northeast Utah's Recent Discoveries

**by Philip C. Ingalls**

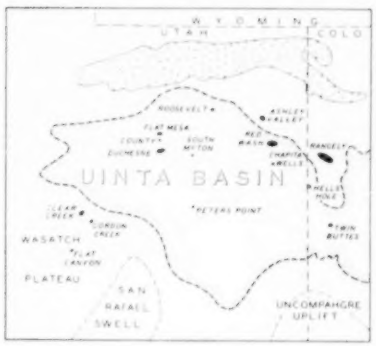
THERE have been four discoveries in northeastern Utah so far this year—two oil and one gas within the Uinta basin and a gas discovery at the northern end of the Wasatch plateau.

Carter Oil Co. 1 Duchesne County, a completed wildcat located in 25-3s-5w about 3½ miles southeast of the Flat Mesa discovery, found oil in the middle Green River section to open a new pay for the basin. (All other Tertiary oil production in the basin is from the basal Green River or the Green River-Wasatch transitional zone). This discovery was completed flowing 266 bbl. of oil plus 30 per cent water through a 19/64-in. choke in 22¼ hours from a fractured zone above 5,257 ft. It had been staked as a confirmation well to Flat Mesa and was scheduled to be carried to the Wasatch. The unexpected discovery was made when mud-logger-indicated shows were drill-stem tested.

High interest in the County discovery stemmed not only from the fact that it opened a new pay for the basin but also from the fact that it produced an entirely different kind of oil from that which is found at other Tertiary discoveries in the basin. Roosevelt, Red Wash, Duchesne, and Flat Mesa fields all yield crude oil which has a pour point of 90° to 100° F. but, from field to field, varies in color from dark green or black to light yellow or orange, and in gravity from 30° to 43°. The crude at County is 23.5°-gravity, black oil with a pour point of only 30°.

The other oil discovery within the limits of the Tertiary basin is Continental Oil Co. 1 Chapita Wells. This wildcat flowed 62 bbl. of oil and 3 bbl. of water in 4 hours through a 14/64-in. choke from the Cretaceous-Mesaverde. The discovery, located in 16-9s-23e, is the first Mesaverde oil-well completion in the Uinta basin. Late in 1951, a wildcat about 18 miles to the southwest of Chapita Wells had a sizable show of Mesaverde oil on a drill-stem test, but attempts to complete the well as a commercial producer were unsuccessful. Hells Hole is a 1951 gas discovery in the Mesaverde.

The most recent discovery in the basin is El Paso Natural Gas Co. 2 Peters Point, 36-12s-16e. This well flowed 2,120 M.c.f. of gas daily through tubing from the Wasatch above 3,231 ft. It is just a little more than a mile northwest of a dry hole completed in 1952.




Interest in the gas potentialities of the northern portion of the Wasatch plateau is at an all-time high as a result of the discovery of Clear Creek in 1951, a new pay at Gordon Creek in 1952, and a recent discovery at Flat Canyon. The Flat Canyon discovery, 27-16s-6e, is Three State Natural Gas Co. 1 Kearns, which flowed 3,250 M.c.f. of gas daily through 3-in. tubing from the Cretaceous-Dakota topped at 7,002 ft. and is testing. This discovery lies south of Clear Creek and Gordon Creek where gas production is from the Ferron sands in the Cretaceous-Mancos shale.

The gas fields on the Wasatch plateau have the highest producing wells in the country. One of the five active drilling locations at Clear Creek has a ground elevation of 9,734 ft. Wells in this field have initial gas flows ranging between 10 million and 35 million cubic feet daily through tubing.

Over on the east side of the Uinta basin, specifically in that area between Douglas Creek arch and the northern reaches of the Uncompahgre uplift which separates the Uinta and Piceance basins, Greenbriar Oil Co. et al. have a well testing the Dakota at Twin Buttes. This well is in a recently established unit which contains two shut-in gas wells, one a 1951 discovery completed in the Jurassic-Entrada at 7,150 ft. for 7.7 M.M.c.f. of gas daily and the other a 1952 discovery completed in the Jurassic-Morrison at 6,150 ft. for an estimated 2 M.M.c.f. of gas per day.

Development of the Uinta basin's Tertiary oil continues to be cautious and modest, but the indicated gas potentialities of the Wasatch plateau and the Piceance basin are currently attracting notable interest.

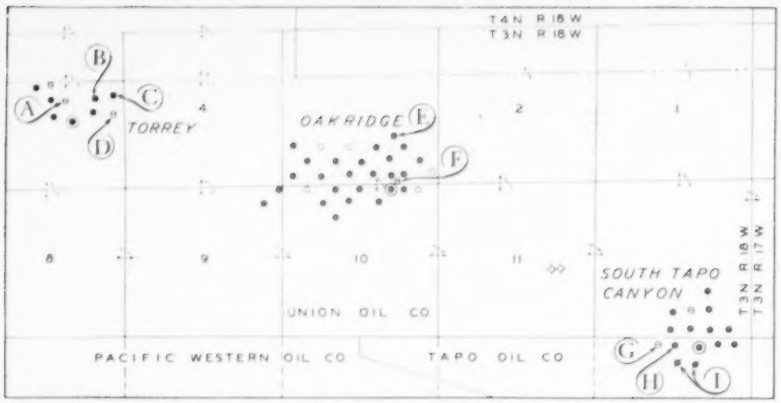
### HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**COLORADO . . .** The California Co. recovered 7,925 ft. of light green oil on drill-stem test in the Lyons (Permian) sand at their West Nunn wildcat in Weld County. The 1 Baiamonte, SE NE NW 6-7n-66w, is the second to find Lyons sand production in the Denver-Julesburg basin.

**OKLAHOMA . . .** Mercury Drilling Co. and P. G. Lake 3 Cogswell heirs, SW NE NW 5-23n-4w, in new Northeast Prairie Valley pool of Garfield County, flowed 33.4 bbl. of oil per hour from Misener perforations at 5,935-41 ft. and flowed 20.6 bbl. of oil per hour from Marshall perforations at 6,056-61 ft.

**SOUTH LOUISIANA . . .** Kerr-McGee Oil Industries, Inc., and Phillips Petroleum Co. have completed a flowing oil discovery in their A-1 State Lease 1997 located in the Breton Sound area.

**MISSISSIPPI . . .** One of the most encouraging deep oil shows that has been encountered in the state is reported in Soso field, Jones County. Gulf Refining Co. 1 Bailey, 27-10n-13w, recovered 4,558 ft. of 43°-gravity oil on drill-stem test at 11,425-35 ft. using ¼-in. chokes.




**Location of Santa Clara Valley's Torrey, Oakridge, and South Tapo Canyon fields. Discovery well of each field is circled. Lettered wells are referred to in text.**

# 16 Discoveries in 2 Years

## . . . in California's Santa Clara Valley, now producing 74,000 bbl. daily

**by D. H. Stormont**
West Coast District Editor

SANTA CLARA VALLEY, running inland from the Pacific Ocean some 50 miles from its mouth near Ventura, has been a substantial factor in California's production increase of the past 2 years.

Current production of the valley's pool is approximately 74,000 bbl. daily, as compared with 47,500 bbl. at the first of 1951. About 11,200 bbl. of the new production is being supplied by three discoveries of the past year: Torrey Canyon deep Sespe, Oakridge, and South Tapo Canyon.

A total of 16 discoveries, including new pays, were recorded in the area during the past 2 years. That the finds were the result of an intensive search is shown by the fact more than 130 exploratory wells were drilled. The activity represented one of the most concentrated searches of any California region.

Discovery of the Castaic Hills area of Honor Rancho field, two new zones at Castaic Junction, and a new fault-block pool at Shiells Canyon also were recorded. These finds are accounting for about 6,200 bbl. of new production. Extension of productive limits at South Mountain field has raised its output to 12,100 bbl., up 6,000 bbl. since the first of 1951.

**South Tapo Canyon . . .** Discovered in February, South Tapo Canyon field is producing about 4,300 bbl. daily. The field's two operators have completed 13 producers, of which 7 were by Union Oil Co. and the others by Terry Drilling Co. An average output of 330 bbl. daily was being attained despite four wells pumping less than 40 bbl. daily each.

Production is from a Luisian sand (middle Miocene) encountered at depths of 2,000 to 2,500 ft. Approximately 120 ft. of pay section is found, of which about 40 per cent is oil sand. The pool is said to be a fault trap on a westerly plunging nose. It is believed to be a depletion-type reservoir; average gas-oil ratio is less than 50 cu. ft. per barrel.

The 28° to 32°-gravity crude is unusual for California in that it is non-asphaltic and contains relatively little gasoline and fuel oil. Because of lack of staining, oil-bearing sections of the pay can easily be passed up if cores are given only cursory inspection.

Initial production of the discovery well, Terry 2 Tapo, was 600 bbl. daily. Best producer was its 4 Tapo (H on map), completed flowing at the rate of 1,570 bbl. daily. At least three wells were sufficiently prolific, flowing and pumping in the range of 1,000 bbl. daily, to yield a payout in less than 3 weeks.

Production has been defined only on the south and west flanks. Terry 8 Tapo (G on map) found the sand wet and was plugged back for redrilling up-structure. Because two small abandoned producers immediately south of Tapo (I on map), encountered Luisian production at 400 to 500 ft., faulting is expected to limit further development south. How much farther north and east production will extend is yet to be determined. It is not expected to be far, however.

**Oakridge development . . .** Northwest of Tapo Canyon about 2 miles, Union likewise has fairly well outlined productive limits of the new Oakridge field. With 25 producers completed, the field has an output of about 3,700 bbl. daily. The company is employing only one rig at present after having kept two or three at work for several months.

Discovery well of the Luisian sand was 2-10 Oakridge. That the zone was productive was shown by 1-3 Oakridge (F on map), however. It was carried to 12,180 ft. in an attempt to find Sespe production and then suspended when water interfered with its completion in the shallow pay.

The wells are completed in about 150 to 500 ft. of pay section, at depths ranging from 1,800 ft. in the northwest portion to 3,500 ft. in southeast producers. Average thickness of oil sand is approximately 150 ft. Because wells had smaller initial productions as development moved away from the discovery area, plus the natural decline in early producers, average per well production is about 150 bbl. daily as compared with 330 bbl. at the first of the year.

Water production has steadily increased, the current average cut being over 30 per cent. The field's performance to date, however, indicates it is of the gas-depletion type. Current average gas-oil ratio is about 750 cu. ft. per barrel.

In early stages of development it was estimated a recovery of about 75,000 bbl. per acre would be obtained over an area of 300 acres. Subsequent development has shown the field will be larger but it is believed recoveries will be only about half that amount.

In addition to 1-3 Oakridge, one other attempt was made to find Sespe or deeper production on the structure. On the northeast edge 11-3 Oakridge (E on map) was drilled to 10,781 ft. before plugging back for completion in the Luisian at 2,400-2,900 ft. Although hole making is no problem, development is proving Oakridge to be one of

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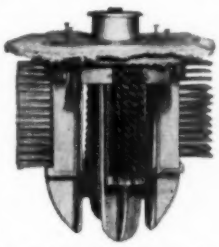

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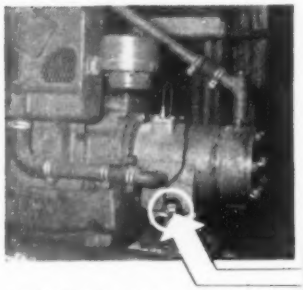

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**Torrey Canyon . . .** Most spectacular of the new finds is Torrey Canyon's deep Sespe pool near the northwest boundary of Union's 33,000-acre fee-owned Rancho Simi property. Most of these wells have broken all state records for thickness of producing section. In one well, 86 Torrey (C on map), 3,690 ft. of continuously perforated liner was set through the lower Sespe and transitional Sespe-Eocene pay zone.

The seven producers completed in the 7,000 to 10,700-ft. pool, all within ½ mile of the 83 Torrey discovery, were producing 3,200 bbl. daily last week. The most recent completion, 89 Torrey (B on map), was finaled flowing over 800 bbl. daily of 25°-gravity crude. It was the best well to date, and like 86 Torrey was bottomed in the Sespe-Eocene.

Currently one rig is at work on a routine well. A second is drilling a deep test, 92 Torrey (A on map), which is drilling below 13,000 ft. and may go to 15,000 ft. in an effort to locate flowing, high-gravity production. In addition The Texas Co. is preparing to start an extension attempt ½ mile northwest.

An average of 3,000 ft. of pay zone is cut, of which about 1,000 ft. is net oil sand. Core analyses have shown the sand to have an oil-in-place content of 600 bbl. per acre-foot. It is estimated recovery will be about 100 bbl. per acre-foot. Or for a 10-acre spaced well, recovery will be approximately 1,000,000 bbl.

Size of the anticlinal structure is yet to be proved but productive limits on the southeast edge evidently have been established by 90 Torrey (D on map.) About ½ mile west of production Texaco 1 Hunter was a failure at 10,150 ft. The company is moving about ¼ mile north for its second test, 2 Hunter.

Shallow Sespe oil sands, at depths ranging from a few hundred to 2,000 ft., have been produced at Torrey Canyon since about 1900. Because of the much thicker section, deep Sespe wells are expected to be producing 75 years from now.

## MICHIGAN

The Richfield oil pay in Cranberry Lake pool, Winterfield Township, Clare County, took on even greater significance this week at the Leonard Drilling Co. & Miami Operating Co. 1 Throop, NW NE NE 11-20n-6w, was under in this objective after a 3,000-gal. acid shot. At last report well was flowing at a restricted rate of from 40-50 bbl. of oil an hour. Of the currently completed Richfield oil wells in Cranberry Lake pool at least 3, all on the west side of the developed pool, have been better than average producers for the pool. This well appears to be the best of the lot and one of the biggest Richfield oil well completions drilled to date in Michigan.

The 1 Throop was drilled to a total depth of 5,150 ft., through the Richfield and into the Black lime, topped at 5,147 ft. A long string of 5-in. casing was set at 5,014 ft. and all of the open pay from the casing seat to the total depth was acidized. A preliminary check of effective pay logged in this 146-ft. section showed about 20 to 25 ft. of pay zone, about a normal amount for this pool.

Natural, the 1 Throop flowed 100 bbl. of oil a day for 4 days before being acidized —the best natural performance of any well in the pool. During the first 11 hours after the acid treatment, well flowed back 406 bbl. of net oil through a restricted choke. In 3 hours on another test well flowed 162 bbl. of oil through a ¼-in. choke. Further production tests were to be run before a flow rate and completion schedule would be announced for this well.

Acid was ordered for the McClure Oil Co. 1 Howk, SW SW NW 19-8n-5w, North Plains wildcat, Ionia County, likely new Traverse oil discovery well. The Howk well, located to the south of Bloomer Traverse pool, Montcalm County, about 4 miles, pumped 18 bbl. natural prior to announcement that it would be acidized at its present depth, 2,578 ft., and probably completed at that point. Top of Traverse was at 2,563 ft. and hole carried about 600 ft. of free oil in 24 hours after pay, showing at the TD, was logged.


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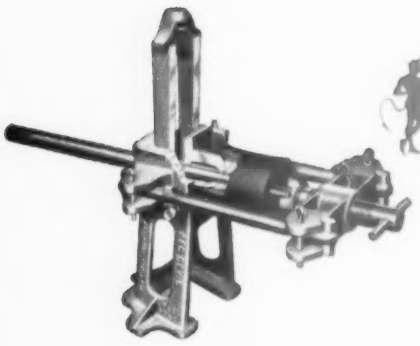

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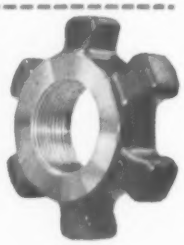

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## LOUISIANA

### SOUTH LOUISIANA

### Breton Sound Exploration Yields New Oil Discovery

Kerr-McGee Oil Industries, Inc., and Phillips Petroleum Co. have opened what appears to be an important new oil field on their 78,476-acre block of leases in Breton Sound, off the east coast of Plaquemines Parish.

The discovery well, located on State Lease 1997, in Block 20, flowed in completion tests at the rate of 312 bbl. of oil per day through chokes from a Miocene sand opposite which casing is perforated at 5,864-75 ft. The sand is one of at least three potentially productive zones found in the well, drilled to a total depth of 8,458 ft.

The discovery is the third by these joint operators on their Breton Sound block this year. The two previous discoveries were gas producers, one being in Block 35 from sand at 4,886-93 ft., and the other in Block 45 from two sands at 4,505-45 ft. and 4,888-93 ft.

Location of the new oil discovery is approximately 5½ miles north of the high-reserve Breton Island gas field, located near the south edge of these operators' large block and discovered in 1948 by Sunray Oil Corp.

Several additional prospects have been indicated on the block, on which these operators have been conducting an extensive core-drilling exploration with upwards of 40 core tests to depths around 3,200 ft. having been drilled so far this year.

The oil-discovery well, located in 18 ft. of water, was drilled with Kerr-McGee's wholly owned, deep-water drilling barge, which has been moved one location south on State Lease 2000 for a confirmation test.

### Fourth Sand Proved In West Delta Discovery

Another oil-producing sand, the fourth, has been proved by Continental Oil Co. in its new off-shore discovery well in the West Delta area of Plaquemines Parish.

Latest sand tested was perforated at 6,370-88 ft., from where the well, located on State Lease 978, in Block 53, flowed 170 bbl. of 27°-gravity oil in 24 hours through 10/64-in. choke with 700-psi. pressure on the tubing.

Previously, oil production had been proved in successive tests of sands at 12,330-46 ft., 11,590-602 ft., and 10,776-98 ft. Other sands higher up the hole are to be tested before the well is completed.

Testing was started with hole drilled to 13,034 ft. and casing run to 12,400 ft.

### Bay Junop Dome Gets Second Deep Producer

The long-explored Bay Junop dome, in the coastal marshes of southern Terrebonne Parish, on which first production was opened last January, got its second well the past week with the completion by The Texas Co. of its 3-3 Bay Junop Unit as a gas-distillate producer from a sand at 13,774-80 ft.

The new producer, a location removed from the initial well, 2-3 Bay Junop Unit, opens another pay zone, the discovery well having been completed from a sand opposite which casing is perforated at 12,666-82 ft. Initial production was gaged at the rate of 65 bbl. of 45.4°-gravity distillate and 3,460,000


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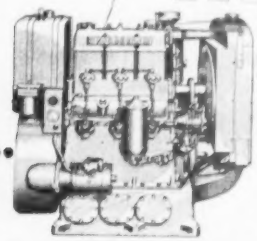

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cu. ft. of gas per day through 3/8-in. choke. Both wells are on the north side of the dome.

Bay Junop dome is one of a group of early geophysical prospects leased originally by Louisiana Land & Exploration Co. and acquired by The Texas Co. in 1928. The latter company turned back the acreage in 1931 after drilling three dry holes. It later re-acquired the block and drilled two more dry holes. Still later, Union Oil Co. of California entered the picture, drilling nine dry holes. The two companies, jointly, then drilled seven more dry holes before finding production last January.

### NORTH LOUISIANA

## Smackover Pay to Be Sought at Ada Field

Carter Oil Co. will try for the Smackover lime at a 12,000-ft. wildcat in multiple-pay Ada field, Bienville and Webster parishes. Contract will be awarded July 13 for 3 Nora Davis in the C NW NE NE 34-18n-8w.

Ada field was opened in 1944 by Carter. The field has production in the Mooringsport, Rodessa, Pettit, Travis Peak, Jeter and Hill zones. The field's deepest well is Union Producing Co. 1 Walker unit, Section 30-18n-8w, which was taken to 10,383 ft. into the Travis Peak. As of February 1951 there were 12,760 proven acres in the field with Carter, J. S. Rushing and Atlantic Refining Co. the principal operators in the field.

# OKLAHOMA

## Coring Continues at Cleveland County Test

With Tulip Creek pay established on several good tests Pure Oil Co. is coring at 8,034-56 ft. at 1 C. E. Hobaugh, SE SW SW 30-8n-1w, Cleveland County discovery 3 miles east of the town of Noble.

A drill-stem test in the Tulip Creek at 7,878-7,903 ft. had gas to the surface in 6 minutes and oil in 13 minutes with the oil flow going to the pits for 21 minutes. A later test at 7,907-24 ft. flowed oil in 13 minutes and recovery was 7,637 ft. of oil. Another test at 7,928-45 ft. recovered 480 ft. of oil.

## South Erin Springs Extended Northward

The South Erin Springs area has been extended northward at 1 Burkleo "B," C SW NE 27-4n-4w, in the northwestern part of Garvin County. The Hart and Springer sand well flowed 325 bbl. of oil in 18 hours through a 20/64-in. choke. At 1 Hughes Slay in the NE SW Section 27, Superior Oil Co. is taking production tests. The Springer sand well flowed 111 bbl. of oil per day through 3/4-in. choke. Superior also has a wildcat drilling at 1 Reeves, C SE SW Section 21. It will go to 9,100 ft.

Development of the Purdy area continues at Magnolia 1 Duncan-Williams unit in SE NW 6-3n-3w. The well was completed flowing 64 bbl. of distillate per day with 1,299 M.c.f. of gas per day from the Hart sand perforations.

## Drilling Activity Up

Drilling in Oklahoma showed a considerable increase in the second quarter of 1953. Completions were up 7½ per cent over the first 3 months of the year, locations were up 15 per cent, and the number of wildcats staked showed a substantial 40 per cent increase. Completions for the week ended July 11 totaled 169, the highest point of the year. This total was also reached during the week of June 13.

## West Well at Kendrick Flows at High Hourly Rate

The westernmost well in Kendrick pool, Lincoln County, flowed 672 bbl. of 50°-gravity oil in 5 hours and 40 minutes through a 3/4-in. choke, or at the rate of 118 bbl. per hour. The Oswego well flowed through perforations at 3,353-73 ft. after acid treatment. The well, Sun Oil Co. 2 Curry, is located in the NW NE NW 9-15n-5e. Sun will drill 3 Curry in the NE NW NW Section 9.

In the southeastern part of Lincoln George Pasquella 1 Vanderpool is a possible discovery in the SW SW NW 28-13n-6e. A drill-stem test at 4,428 ft. in the second Wilcox recovered 100 ft. of heavy black oil and 30 ft. salt water. Operator will run oil string casing and is taking a core in the second Wilcox.

# MISSISSIPPI

## Soso Deep Test Finds Lower Cretaceous Oil

A discovery of possible major significance for southern Mississippi is indicated in the Soso field at the juncture of Jones, Jasper, and Smith counties, where a substantial recovery of high-gravity oil has been made from a lower Cretaceous formation in a deep test being drilled by Gulf Refining Co.

The lower Cretaceous, which has received only limited exploration in southern Mississippi, so far has been found productive only in a half dozen fields in this area. General exploration and development has been mainly to the Tuscaloosa (basal upper Cretaceous) or shallower horizons.

Recovery from the lower Cretaceous at Soso was made in a drill-stem test in Gulf's 1 Bailey, NE SW SE 27-10n-13w. It totaled 4,558 ft. of 43°-gravity oil with tester open only 30 minutes with 1/4-in. chokes and using 3,500 ft. of water cushion. Bottom-hole pressure gaged 3,800 psi. flowing and 5,350 psi. after being shut in 15 minutes. Interval tested was at 11,425-35 ft. in what is believed to be the equivalent of the Rodessa zone.

Hole, cored ahead to 11,523 ft., found interbedded sand and shale with oil shows to 11,490 ft.

Soso, discovered in 1945, currently is productive of gas and condensate from Eutaw (upper Cretaceous) sands at depths of 6,400 to 6,700 ft. Developed area extends over more than 7,300 acres. Cumulated production through 1952 totaled 48,608,805 M.c.f. of gas and 1,033,401 bbl. of condensate.

# KENTUCKY

### EASTERN KENTUCKY

In Lawrence County near Deephole about 8 miles north of Louisa, the county seat, Dawson et al are drilling at 1,736 ft. at No. 1 Roberts. Top of Berea sand was found at 1,708 ft. and shows of oil and gas have been had to present depth. Well is located in an area of old former Berea production.

In Magoffin County and located on Beetree Branch, Kentucky-West Virginia Gas Co.

have a shallow Pennsylvanian salt sand well at their 1001 Amos Wireman. Top of sand was had at 849 ft. and penetrated to 866 ft. total depth. On initial potential well flowed naturally at the rate of 577,000 cu. ft. of gas daily with a 26 hour rock pressure of 210 pounds.

## CANADA

### Devonian Oil Found At Acme Area Wildcat

Devonian D3 oil has been discovered at a wildcat in the Acme area of southern Alberta, 37 miles northeast of Calgary, by the team of Canadian Delhi Oil, Ltd., and Banff Oil, Ltd. This new strike also gave up an encouraging showing of oil in the D2 horizon.

The discovery well, Delhi-Banff 1 Acme, LSD 13, 22-29-25w4, is 2½ miles east of Acme town, 5 miles southeast of the Baysel 1 Linden abandonment, and 9 miles east of Canadian Superior 14-30 Jackson abandonment.

Crew entered D2 at 6,953 ft., or 3,951 ft. subsea, and obtained the oil showings from the following drill-stem tests: Interval 6,950-7,001 ft., 30 minutes, gas in 6 minutes, at estimated rate 10,000 cu. ft. daily, recovered 120 ft. of 38°-gravity black-green oil and 180 ft. salty sulfurous water. Straddle packer test was then run from 6,953-75 ft. for 2 hours, and gave a recovery of 115 ft. oil and 350 ft. salty sulfur water.

The Green shale was entered at 7,063 ft., or 4,061 ft. subsea and D3 coral reef was cored into at 7,122 ft., 4,120 ft. below sea level. An 83-minute drill-stem test from 7,118-43 ft. flowed gas in 4 minutes, at rate 250,000 cu. ft. daily. Well started spraying oil, gas, mud and a little water in 40 minutes, and in 50 minutes it commenced flowing by heads. Fluid recovery was 2,650 ft. of gas-cut oil and 1,130 ft. of salty sulfur water. Gravity of the oil is 39.5°.

Hole was taken down to 7,203 ft., logs were run and string of 7-in. production casing has been cemented at total depth. A portion of the indicated 12 ft. of oil pay zone will be perforated over the weekend end production testing will be carried out during the following week.

**Manyberries area . . .** West Canadian Petroleums, Ltd., has discovered a flow of natural gas at its wildcat in the Manyberries area of southeast Alberta, 15 miles southeast of Pakowki Lake and 55 miles south of Medicine Hat.

This gas strike, West Canadian 13-20, South Manyberries, LSD 13, 20-3-5w4, is 7 miles southeast of McColl-Frontenac's 7C-31 abandonment. The natural gas came from the Ellis sand portion of the Jurassic, with the sandstone being contacted at 3,549 ft. Initial drill-stem test, from 3,547-72 ft., flowed gas at maximum rate 2,500,000 cu. ft. daily through ½-in. choke, and recovery was 70 ft. of sulfurous water in 85 minutes. Crew is now running production casing.

**South Camrose . . .** Swabbing operations at the Bay-Kroy-Yankee Princess group's Viking sand extension in the Camrose (South) area of Alberta yielded approximate 36°-gravity clean crude oil at rate of 4 to 5 bbl. hourly. Crew is now installing pump and running rods preliminary to an extended pump test in an effort to further evaluate the oil find, prior to decision on follow-up drilling.

The extension success, Bay-Kroy 4-24 South Camrose, LSD 4, 24-46-20w4, is 140 miles southeast of Calgary and 1¾ miles northeast of other production in South Camrose Viking sand oil pool.

The Viking was entered at 3,190 ft. or 743 ft. below sea level. Casing was set and the interval 3,222-27 ft. was perforated for the swab tests. The well was drilled by the Bay Petroleum Corp., Kroy Oils, Ltd., and Yankee Princess Oils, Ltd.

#### EASTERN CANADA

**Gaspe . . .** In the Gaspe peninsula, Quebec 1 Asphalt Base on the Galt Brock dome, for some time making gas, has encountered a show of black oil, similar to seepage oil about 1 mile northeast of location. After preliminary tests, which failed to increase the quantity, samples were sent to Montreal for laboratory analysis. The well is now deepening in hard formation below 1,141 ft. with gas and black oil shows continuing.

On the same structure, Continental 1 Deep Test after two nitroglycerin shots to correct formation irregularities is deepening below 2,939 ft.

On the Bald Mountain anticline 2, Bald Mountain is below 5,345 ft. and believed nearing the coral reef formation where commercial production is anticipated. On the Tar Point anticline 1 Tar Point is making gas from 7,069 ft. and waiting control equipment. Quebec Oil 2 is below 5,497 ft.

**Ontario . . .** In Warwick Township, Lambton County, 2 miles west of Warwick, Imperial Oil has capped its gasser on the Hollingsworth farm and is moving to a new location. No production figures have been released. Gas was struck around 1,800 ft., deeper than in the Dawn field farther west and south.

Petrol Oil & Gas Co. of Toronto last year drilled six shallow tests on the Six Nations Indian Reserve near Brantford, securing six small producers.


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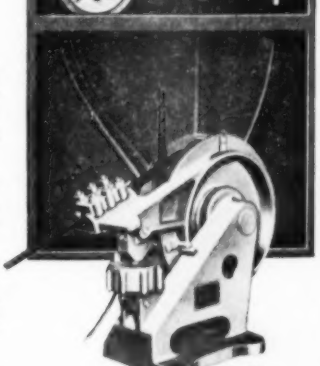

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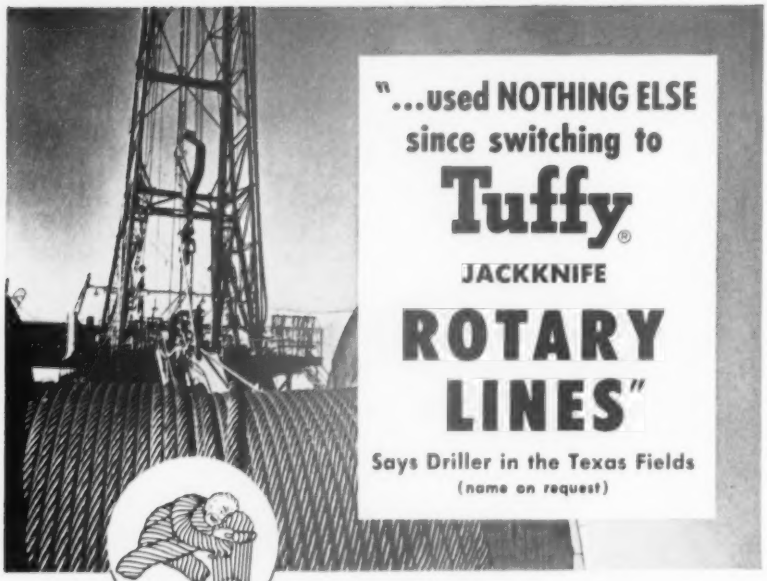

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# TEXAS

WEST TEXAS

## Delaware Sand Exploration In the Delaware Basin

A new Delaware sand producer has been completed in northwestern Reeves County, Texas, and in southwest Winkler County, one of two Delaware exploratory tests by Magnolia Petroleum Co. was undergoing flow tests. When completed, the Winkler discovery will be the first oil production in the county from the Delaware Mountain group.

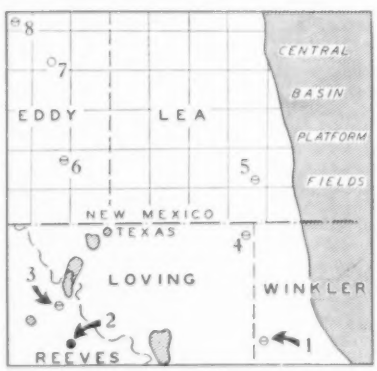
Importance of these shallow discoveries is twofold. Geological studies of the Delaware basin which underlies portions of Eddy and Lea counties, New Mexico, and extending southward to include Loving, Ward, Culberson and Reeves counties, Texas, rates this vast territory as favorable for oil reservoirs of Delaware Mountain age (middle Permian). Throughout this area the Delaware sand is found at economic depths and considerable interest is evidenced by the number of tests being drilled.

While the production from Delaware sand wells is relatively small, it is the only proved producing zone for this area between the surface and the pre-Permian. Development of pools comparable to Wheat and Tunstill in Loving and Culberson counties will afford support money from a number of operators to help offset the cost of finding out what lies below their Permian pay. Development of this oil-bearing objective might add incentive, at the same time providing a second chance if the deep formations are dry.

Operators expect to find big oil in the pre-Permian rocks of the Delaware basin. But until they find more Delaware sand oil and learn more about the section to this depth, deeper exploration will necessarily be with wildcats that are rank all the way down and therefore very expensive.

**Map Legend**

**1 . . .** On the accompanying map is Magnolia 1-39862 University, bidding for first Delaware sand production in Winkler County.




Top of the sand was 5,096 ft., total depth was 5,105 ft. and 7-in. casing was set at 5,099 ft. First drill-stem test was run from 5,099-5,105 ft. Gas flowed in 1½ minutes and oil in 30 minutes, and during the next 30 minutes the tool was open it gaged 4 bbl. of oil with no water. Recovery in the pipe was 5,050 ft. of 41° oil and 40 ft. of salty water. Later testing, on ½-in. choke, gaged 7.8 bbl. of oil with no water in 2 hours, then in the following 22 hours, on ¾-in. choke, it flowed 69.5 bbl. of oil with no water.

Nearest production is the Monroe field, 12 miles southwest, and directly west lies Wheat

field in Loving County which produces from Delaware sand.

**2 . . .** Buffalo Oil Co. 1 Herman Lindley, west of Wheat field, completed as a Delaware sand discovery, making 55 bbl. of 34° oil a day on pumping potential. Production was from perforations at 3,406-10 and 3,422-32 ft., after acid treatment.

**3 . . .** Buck Jones Drilling Co. 2 Daughetee, southwest of Tunstill pool, Reeves County, found Delaware sand around 3,125 ft., fractured the section with acid, and flowed 56 bbl. of oil plus 148 bbl. of water in 10 hours through 14/64-in. choke. Total depth was 3,192 ft. Operators prepared to test on the pump.

**Pre-Permian Exploration**

**4 . . .** Sun Oil Co. et al 1 J. B. Tubb, northeast corner of Loving County, had no oil shows in the lower formations and planned to test up the hole. Total depth was 12,105 ft. A drill-stem test while drilling at 7,766-7,809 ft. recovered oil and gas-cut mud, and a test from 8,850-76 ft. developed 270 ft. of slightly oil-cut mud.

**5 . . .** Sun Oil Co. 1 Harper-Federal, Lea County, New Mexico, an old well deepened from 6,054 ft. to 14,993 ft., which may drill a new hole from whipstock at 10,530 ft. Tentative top of the Strawn was 13,135 ft. Perforations from 14,775-14,837 ft. flowed 115,000 cu. ft. of gas a day on ¾-in. choke. Perforations at 13,382-14,426 ft. flowed a small stream of oil for 6 hours, was shut in for 4 hours, then flowed gas and wash water.

**6 . . .** Richardson & Bass 1 Harrison-Federal, 12-25s-30e, was drilling ahead below 15,005 ft. in lime and shale with a trace of chert. This well flowed 8 bbl. of high-gravity oil in 1 hour on drill-stem test from 12,215-12,365 ft.

**7 . . .** Richardson & Bass 1 Legg, a new operation in 27-22s-30e, projected to 13,500 ft. Rotary rig was being moved in from 1 Cobb-Federal.

**8 . . .** Richardson & Bass 1 Fidel-Federal, 27-21s-29e, was drilling lime and shale below 13,809 ft. A drill-stem test from 12,231-12,337 ft. blew an estimated 50,000 cu. ft. of gas a day.

**NORTH TEXAS**

## New Sand Section Flows At Grayson Pool

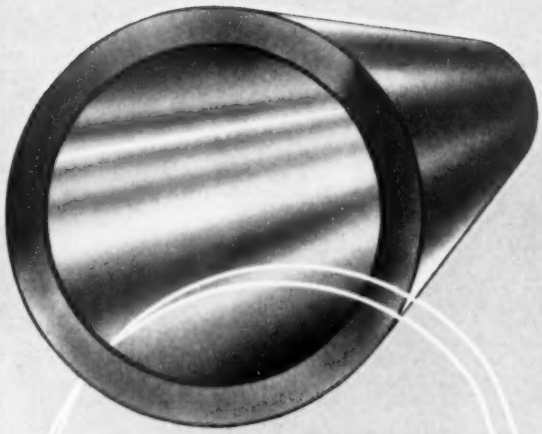
The Mackoy field in Grayson County, southeast of Whitesboro, had a new producing horizon in the Strawn at Phillips Petroleum Co. 1-A Watson. Perforations were made in an upper sand from 4,471-78 ft., from which the well flowed 101 bbl. of 27° oil a day.

Dual completion was also made in a regular pay from 5,072-5,100 ft., where potential was 142 bbl. of oil a day. Location is in the J. M. Thomas Survey, A-1232.

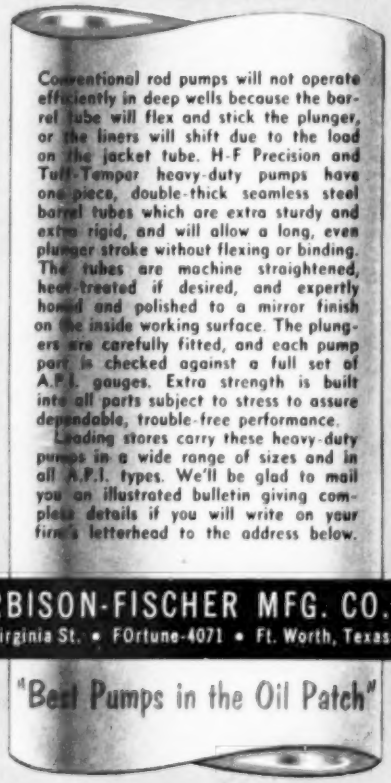
**Big Mineral extension . . .** Sun Oil Co. 2 George Ferrill, 1-mile east extension prospect in the E. C. Smithson Survey, had casing set on bottom at 5,376 ft. for completion attempt. A 1-hour drill-stem test from 5,311-5,336 ft. had gas in 11 minutes and flowing oil in 35 minutes. Recovery in the pipe was oil with no water.

A new potential has been filed on Superior Oil Co. 1 E. A. Sturgess, discovery 2 miles northeast of Whitesboro. The well originally flowed 98 bbl. of oil a day through ¾-in. choke from pay at 6,122-37 ft. Following completion tests the flow died, and a second potential gage, on the pump, was 141 bbl. daily.

**Nolan townsite test . . .** General Crude Oil Co. 1 Nolan Townsite, 310-64-H&TC, de-

Harbison-Fischer Heavy-Duty Rod Pumps with double thick barrel tubes for deep well pumping



Conventional rod pumps will not operate efficiently in deep wells because the barrel tube will flex and stick the plunger, or the liners will shift due to the load on the jacket tube. H-F Precision and Tuff-Temper heavy-duty pumps have one piece, double-thick seamless steel barrel tubes which are extra sturdy and extra rigid, and will allow a long, even plunger stroke without flexing or binding. The tubes are machine straightened, heat-treated if desired, and expertly honed and polished to a mirror finish on the inside working surface. The plungers are carefully fitted, and each pump part is checked against a full set of A.P.I. gauges. Extra strength is built into all parts subject to stress to assure dependable, trouble-free performance.

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veloped 60 ft. of oil and 90 ft. of oil-cut mud on a 1-hour test at 3,728-38 ft. in the upper Pennsylvanian. Second test from 3,738-48 ft. returned 20 ft. of oil-cut mud. Projected depth was 6,300 ft. to test the Ellenburger. Location in eastern Nolan County is about 3 miles northwest of the same firm's 1 Bennett, dry at 6,277 ft.

TEXAS GULF COAST

### Brazoria County Wildcat Makes Prolific Gas Flow

R. L. Daniels and M. W. Messer of Corpus Christi have uncovered a new, prolific gas-distillate producing area 4 miles southwest of Alvin, in Brazoria County, where their 1 Clark, testing open hole below 10,807 ft., flowed at the rate of 101,000,000 cu. ft. of gas daily with distillate at the rate of 32 bbl. per million cubic feet. With well shut in, pressure built up to 8,250 psi. Total depth is approximately 10,815 ft., where the well, before casing was run, had threatened to blow out. Location is about 1¼ miles northwest of the Rowan field.

## KANSAS

### Central Uplift Activity

Testing is under way at a possible pool opener in eastern Trego County at Lafayette Oil Co. and Schaffer Drilling Co. 1 Baugher, SW SW SE 21-12s-21w, 1½ miles west of Northwest Ellis pool. A drill-stem test in the Lansing at 3,581-3,611 ft. recovered 60 ft. of heavily oil-cut mud, 200 ft. of oil and 40 ft. oily water. The Arbuckle also had a show of oil below 3,933 ft. to 3,942 ft., total depth.

Barton County has a new discovery going on the pump at Schermerhorn Oil Co. 1 Merten, NW NE SE 35-19s-15w, 2 miles northeast of Fleske pool in the southwestern corner of the county. Operator swabbed 8 bbl. of oil per hour from the Lansing.

Ellis County has a new discovery going on the pump after swabbing 10 bbl. of oil per hour. The Sidey and Blair 1 Schmeidler, NE SE SE 20-12s-17w, ¾ mile north of Schmeidler pool, separated by dry holes, is an Arbuckle strike.

### Rank Test Slated

Superior Oil Co. of California will drill a rank wildcat at 1 Balmer, NW NW NW 15-32s-6w, 15 miles northwest of Bluff Creek pool in northeastern Harper County in southern Kansas. The test, which is being rigged up, is located 3 miles southeast of the town of Harper.

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## ROCKY MOUNTAIN

COLORADO

### Second Permian Discovery In Denver-Julesburg Basin

The California Co. recovered 7,925 ft. of clean oil in a 5-hour test of the Lyons sand at 1 Baiamonte, SE NE NW 6-7n-66w, in the West Nunn prospect of Weld County, Colorado, for the second apparent discovery in the Lyons sand (Permian) in the Denver-Julesburg basin.

The first production in horizons below the Cretaceous in this basis was in the Lyons sand. Discovery well was Sherrod & Appersons 8 Gillette, C NW NW 9-9n-61w, a deepening in Keota field, Weld County.

Test at the current discovery was of the interval 8,900-40 ft. There was no water with the 7,925 ft. recovery and maximum mud cut was 2 per cent. Pressures have not been reported by the operator, except that they are said to be substantial.

Sample top of Lyons was at 8,916 ft. and a core from 8,920-40 ft. recovered 19 ft. of white, friable, tight and well-stained sand. Oil recovered on the test was light green, and was reported as "above 32° gravity."

Following the discovery in Keota field earlier this year there was a flurry of drilling to the deeper horizons northeast and south of the field, but no further success was encountered prior to the current California Co. discovery, which is located on a seismograph prospect. The operator is running logs on the apparent discovery, and may complete at the present depth.

### Another Adams County Discovery Near Completion

Fallon Gas Co. of Denver is running casing at the 1 Scott, SE SE SE 21-2s-57w, an apparent new pool opener in eastern Adams County. The well made 1,320 ft. of 42°-gravity oil on 30-minute test of the "J" sand. The well is at 5,404 ft. total depth.

The wildcat, first operation in the Denver-Julesburg basin for the firm, tested the zone 5,368-85 ft. Recovery included, in addition to the oil, 300 ft. of heavily oil-cut mud and 180 ft. of gas-cut fresh water. The discovery is the very active Little Beaver-Badger Creek trend, and is 1 mile southwest of

Badger Creek and 1½ miles east of Middlemist field.

NEBRASKA

## Kimball County "J" Sand Discovery Indicated

Natural Gas & Oil Co. of Denver, a subsidiary of the Mississippi River Fuel Co., recovered 450 ft. of oil, 90 ft. of mud-cut oil and 180 ft. of mud on drill-stem test of the "J" sand at 1 Robinson, SE SE 26-15n-55w, Kimball County, Nebraska. The well is on acreage farmed out from Sinclair Oil & Gas Co. about 3 miles northeast of the town of Kimball. Test was run of the interval 6,028-35 ft. and the operator is running casing at total depth of 6,074 ft. The apparent discovery is the first operation for this firm in the Denver-Julesburg basin.

## Three Chadron Arch Wildcats Plugged

Superior Oil Co. has plugged two wildcats drilled as part of a continuing exploratory campaign along the Chadron Arch area of Nebraska. In Box Butte County the operator drilled 18-5 Johnston, SW SW SW 5-25n-50w, to a total depth of 4,113 ft. without shows. In Hayes County a failure was reported by Superior at 88-1 Schneider, SE SE SE 1-5n-31w, also with no shows reported. In the west-central portion of the state Pure Oil Co. abandoned 1 Manning, NW SW 16-23n-38w, Grant County. Total depth was 2,701 ft., with details not yet reported.

WYOMING

## Crook County Wildcat Reports Newcastle Show

Petroleum Exploration Co. of Buffalo, S. D., has reported a swab gage of 25 bbl. of 39.4°-gravity oil from the zone 1,665-75 ft. at 2 Barton, NW NW 31-50n-66w, in the Grasshopper Creek area of Crook County, Wyoming. The operator is reported running casing with total depth at 1,681 ft. and will attempt production from open hole without treatment. Production is from a 10-ft. saturation section of Newcastle sand.

## Confirmation in Middle Mountain Nearing Objective

Stanolind Oil & Gas Co. is drilling below 6,005 ft. at the 2 Unit, C SW NW 11-12n-103w, confirmation effort in the Middle Mountain unit, Sweetwater County. The operated tested the zone 5,660-79 ft., in Mesaverde and recovered 10 ft. of 33°-gravity oil and 190 ft. of gas and oil-cut mud. A test from 5,680-5,700 ft. recovered only 210 ft. of slightly gas and oil-cut mud. The discovery well in this unit, about ¼ mile northwest of the current well, flowed 169 bbl. of oil and more than 1,000 M.c.f. of gas per day.

MONTANA

## Heath Discovery Indicated In Devil's Basin

Farmers Union Central Exchange has tested Heath at 2 NPRR, NE NW SW 5-10n-25e, in the Devil's basin area of Musselshell County for an apparent discovery. The operator tested the interval 2,134-2,220 ft. and recovered 679 ft. of oil and 210 ft. of oil-cut mud with no water in 2 hours. Flowing


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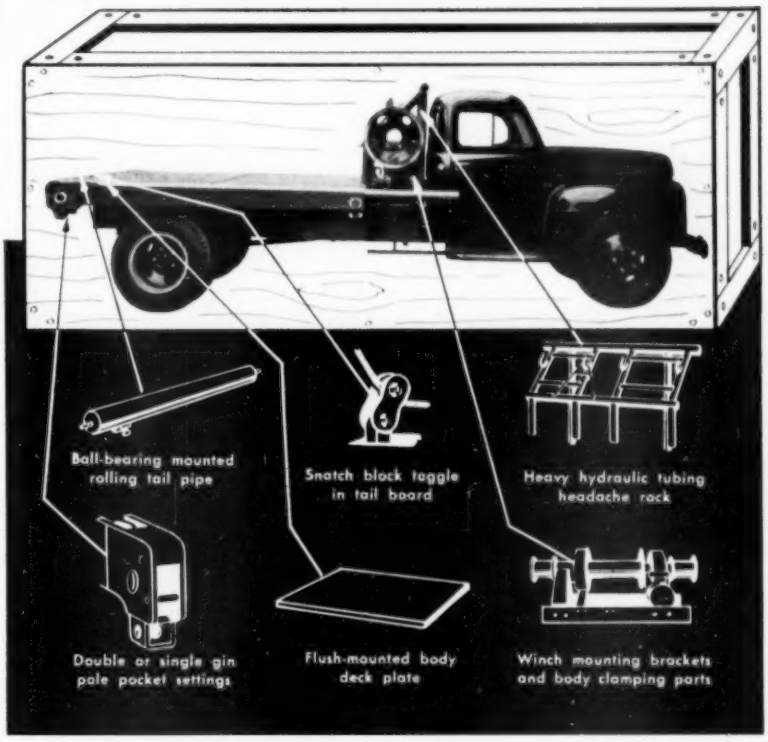
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pressure was 396 psi., and shut-in pressure 1,085 psi. The oil is 25.5° gravity. The wildcat is ¼ mile west of one drilled in this area by this operator in 1952 with no shows reported. Tops have not been reported but test is believed in the Heath sand.

## Williston Basin Reports

Five Geological Survey reports on the ages of Paleozoic strata encountered in wells in the Montana-North Dakota portion of the Williston basin were released recently by the Secretary of the Interior.

The reports consist of modified strip logs, one per well, showing intervals of known Mississippian and older rocks in each of five wells. The vertical ranges of rocks in the Paleozoic systems were determined through study of fossils collected from cores taken from the wells. Fossils are not listed, but the age significance of each fossil collection is entered on the log opposite the depth from which the fossils occurred in the well.

The five wells covered by the reports are Amerada Petroleum Corp. 1 Clarence Iverson, Williams County, North Dakota; Empire State Oil Co. 1 Hathaway, Dawson County, Montana; Murphy Corp. 1 East Poplar Unit, Roosevelt County, Montana; Shell Oil Co. 1 Pine Unit, Wibaux County, Montana, and 1 NPRR (Richey area) Dawson County, Montana.

The five reports, each entitled "Geologic Age Log," compiled by Robert P. Kunkel and Constance L. Nieschmidt from data provided by eight Geological Survey and two National Museum paleontologists, have been placed in open file for public inspection at Geological Survey offices, Room 1033 (Library) and Room 4240 General Services Administration Building, Washington, D. C.; 315 Federal Building, Billings, Mont.; 468 New Customhouse, Denver; 234 Federal Building, Tulsa; 504 Federal Building, Salt Lake City; and 305 Federal Building, Casper.

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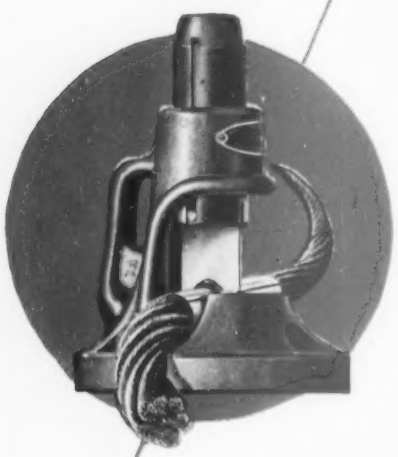

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# CALIFORNIA

## Standard Completing Oxnard Deeper-Pay Discovery

Standard Oil Co. of California was in process of completing a test which is expected to give Oxnard field, Ventura County, a deeper pay. The new zone is at a depth of about 6,300 ft. in what is believed to be the Sespe, Oligocene age. Shallower production, at about 3,100 ft., is in sands of upper Miocene age.

Prior to setting pipe at 6,370 ft. in 1 McInnis, a 1¼-hour formation test was made at 6,296-6,375 ft. Approximately 2,000 ft. of fluid was recovered, most of which was clean oil. The deep-zone test had been drilled to 9,525 ft. before a fishing job was encountered which resulted in about 3,000 ft. of drill pipe being washed over.

In 32-3n-21w, about 1 mile northeast of 1 McInnis, the operator had set 9⅝-in. protective pipe at 6,650 ft. in 1 Scholle-Livingston. Results of any tests made in this well were not announced.

## Ventura Avenue Extended

At Ventura Avenue, Shell Oil Co. was preparing to complete 800 Taylor as a ½-mile north extension to the western portion of the field. The interval 11,660-12,285 ft. was perforated for production. Located in 20-3n-23w, 800 Taylor would be the furtherest north producer in the field.

About ½ mile southeast Shell was continuing to test 378 Taylor. Drilled to 15,436 ft. and with 7-in. casing set at 12,180 ft., it is believed the operator is attempting to complete the deep test in the field's new D-8 zone.

With 25 rigs at work Ventura Avenue continues to be the state's most active field. Shell has 16 rigs busy, Tide Water Associated Oil Co. has 5, and Lloyd Corp., Inc., is using 3. At the first of last week, 19 of the rigs were drilling or working at depths below 9,000 ft. Deepest well was Lloyd 3 Sexton, drilling at 15,656 ft.

## Wilmington Extensions Set

Location for the first two wells to be bottomed seaward of the former "stipulated" line on the southeast end of Wilmington field have been announced by Long Beach Oil Development Co.

The wells will be drilled in Parcel J, for which I.B.O.D. is contract-operator for the city-owned submerged lands. Well 83 will be bottomed 800 ft. south of the line and No. 84 about 400 ft. south. While title of the submerged lands was in question, development was kept at least 400 ft. landward of the imaginary line. Start of drilling has been set for September.

## Airport Lease Approved

Numerous changes relative to operating procedures to be followed by The Texas Co. in exploring, and possibly development, of the 1,040-acre Long Beach municipal airport and adjacent city lands have been agreed

upon by the two parties. As a result drilling of at least one wildcat will be started in the next 6 months.

Texaco was awarded the airport lease by the city council last May, following a bid to pay a cash bonus of $104,000 and a royalty of 42.6 per cent. Drilling islands on city lands adjacent to the airport have been approved as sites for wells which will be slanted under the airport. Maximum period of the lease is 35 years.

### Rio Bravo Outpost Staked

Near the town of Shafter and 2 miles northwest of Rio Bravo field, Tide Water Associated Oil Co. will drill 54-18 Capital Co. in 18-28s-25e. The 12,000-ft. Vedder zone test will be about ¾ mile southwest of its 12,630-ft. wildcat abandoned in 1944. Oil shows were found in the Vedder, topped at 12,330 ft., but were not sufficient to make a producer.

## APPALACHIAN AREA

#### PENNSYLVANIA

In Pine Township, Clearfield County, both the 1 O. W. McNauld of New York State Natural and 2 State of Pennsylvania (Tract C) of Manufacturers Light and Heat Co. have been completed as dry holes in the Oriskany sandstone. Both wells encountered an abbreviated sand section of 5 ft.

The 1 O. W. McNauld topped sand at 7,282 ft., elevation 2,324 ft., and is now drilling in limestone at 7,307 ft. The 2 State of Pennsylvania topped sand at 7,182 ft., elevation 2,298 ft., and has been abandoned at 7,232 ft.

In Benezette Township, Elk County, several more wells have recently been completed. The 1 Bateman of Lock Haven Development Co. was completed with an open flow of 17,000 M.c.f. of gas per day. Well head pressure was 3,900 psi. The 1 Van Voorhees of Simon et al had a flow of 10,000 M.c.f. of gas per day and well head pressure of 3,820 psi. Both wells are about ½ mile southwest of 1 W. C. Woodring discovery well.

#### OHIO

M. B. Belden Oil & Gas Co. extended the East Sparta oil pool ½ mile to the south with a producer on R. W. Bogue, Section

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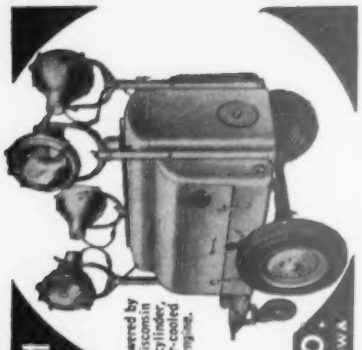
The Insley Manufacturing Corp. of Indianapolis has been manufacturing construction equipment since 1907. The Insley Line includes excavators and cranes, 5 to 30 ton capacity—rubber or crawler mounted—gasoline, diesel or electric powered. There's an Insley working near you.

"There's an Insley working near you"



Trailer-Mounted Floodlight Unit
NITE-HAWK

Powered by Wisconsin 4 cylinder, air-cooled engine.

MAKE NIGHT HOURS PAY with this flexible light and power unit. Four corner-mounted, 80,000 C.P. flood lights raise to 8½ Ft. and aim in all directions. Control panel has duplex receptacles for lines to extension lights and power tools — voltage regulator — circuit breaker — fused circuits — many other features. Tows at highway speeds on heavy-duty trailer with leaf springs and retractable caster wheel. This is the finest, most dependable, low cost 300 to 10,000 watt gas electric plants also available.

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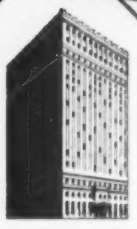
WINPOWER MFG. CO.
NEWTON IOWA
TEL. 236



BUSINESS and Pleasure in TULSA means-



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THE MAYO
TULSA'S *FINEST* HOTEL
*Home of the Popular Terrace Room*


25, Pike Township, Stark County. The oil pay was in the lower Clinton at 4,880-85 ft. and made 250 bbl. in 24 hours after fracturing.

Probably the best results from sand fracturing the Clinton was the increase of the Shuff and Bucy 4 H. S. Mizer, Section 4, Pike Township, Coshocton County. The sand was logged at 3,169-3,212 ft. with 20 bbl. natural and 630 bbl. 24 hours after treatment.

Pure Oil Co.'s second attempt to find production on the S. M. Romine lease in Lot 1, Hanover Township, Licking County, was successful. Clinton at 2,914-70 ft. made 14 bbl. in 15 hours natural and 302 bbl. in 24 hours after fracturing.

## WILDCAT COMPLETIONS

### COLORADO

Adams County: Tuley & Carter and Roden, Darden & McRae 1 Relaford-Kane, SW SE SE 27-2s-57w. Dry. TD 5,675 ft.

Triangle "J" Oil Co. 1 Price, SE SE SE 2-3s-58w. Dry. TD 5,740 ft.

Logan County: Rubco Development Co. 1 Schaffer, NE NE SW 15-8n-55w. IPP 37 BOPD, "J" sand 5,338 ft. TD 5,540 ft. ("D" sand discovery, new field.)

Tri-Mark Oil Co. 1 Propp, NW NW NE 23-10n-51w. Dry. TD 4,562 ft.

Balderson Denver Drilling Co. and Rex Monohan 1 Fluharty, NE NE SE 30-10n-52w. Dry. TD 5,154 ft.

Morgan County: Mid-Continent Petroleum Corp. and W. B. Sinclair 1 Willard Richardson, NE SE NE 29-1n-55w. Dry. TD 5,100 ft.

Washington County: Kewanee Oil Co. 1 Ebendorf, NW SE NE 4-4s-55w. Dry. TD 5,223 ft.

Don Rounds 1 Bollinger & Miller, NE NE NE 29-4n-54w. Dry. TD 5,207 ft.

Falcon Seaboard 1 Kindt, NW NW SE 23-7n-56w. Dry. TD 5,905 ft.

Weld County: Eisenhower Drilling Co. 1 Newton, C NE SW 10-7n-59w. Dry. TD 6,827 ft.

### WYOMING

Big Horn County: Sunray Oil Corp. 1 State, C NW NE 16-57n-97w. Dry. TD 4,056 ft. Madison 3,948 ft.

Fremont County: Sinclair Oil & Gas Co. 1 Sherman Gustin, SE NW SE 15-1s-1e. (WRM). Dry. TD 4,163 ft. porous Tensleep 4,071 ft.

Natrona County: Carter Oil Co. 1 Government Davidson (1 Unit), SE NW NW 8-39n-80w. Dry. TD 4,300 ft. Tensleep 4,223 ft.

Park County: Sun Oil Co. 1 State, C NE NW Tr. 51-16-156n-101w. IPF 200 BOPD, ¼-in. TD 11,246 ft. PBTD 10,120 ft. Morrison 11,197 ft. (third Frontier discovery, new field).

The California Co. 1 Unit, SW SE NW 27-53n-100w. Dry. TD 11,198 ft. Madison 10,919 ft.

Washakie County: Sohio Petroleum Co. 1 Bruce unit, NW SW NW 7-43n-89w. Dry. TD 5,151 ft. Tensleep 5,108 ft.

Walter K. Jorgensen 1 Government, NE SW NE 8-48n-90w. Dry. TD 1,732 ft. Tensleep 1,615 ft.

Weston County: True & Brown 1 Logan, SW NE NE 7-42n-65w. Dry. TD 6,692 ft. Newcastle Pay 6,604 ft.

### UTAH

Emery County: Anderson & Brockbank 1-A McMullin, SE NW SW 12-17s-9e. Dry. TD 1,212 ft. Temp. abd.

San Juan County: Hathaway Co.-Big Horn Powder River Corp. and Cheyenne Oil


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and in the Oil Business —
It's both Pleasant and
Profitable to . . .
*"Think...*
**FIRST"**
An Oil Bank . . . directed by Oil Men in the oil capitol of the World.

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AREA COVERED BY MAP

PIPE LINES AND OFFICIAL OIL AND GAS FIELDS OF THE ROCKY MOUNTAIN AREA

SHOWS: Crude Oil, Gasoline and Natural Gas Pipe Lines with pipe sizes. Refineries with capacity barrels crude per day. Oil fields in green, gas fields in red with official field names. Cities, towns, townships and ranges. Pipe lines and refineries in State of Kansas are not shown. Sketch above shows actual area covered by map.

SIZE: 78" wide by 84" high. SCALE: 1" equals 12 miles.

PRICES:

Blue line on linen $135.00

Blue line on linen attached to heavy spring roller in dust proof steel map case 3" diameter by 87" long, silver finish, where map case hangs on wall and map rolls up and down like a curtain $160.00

Prices F.O.B. Tulsa, Oklahoma

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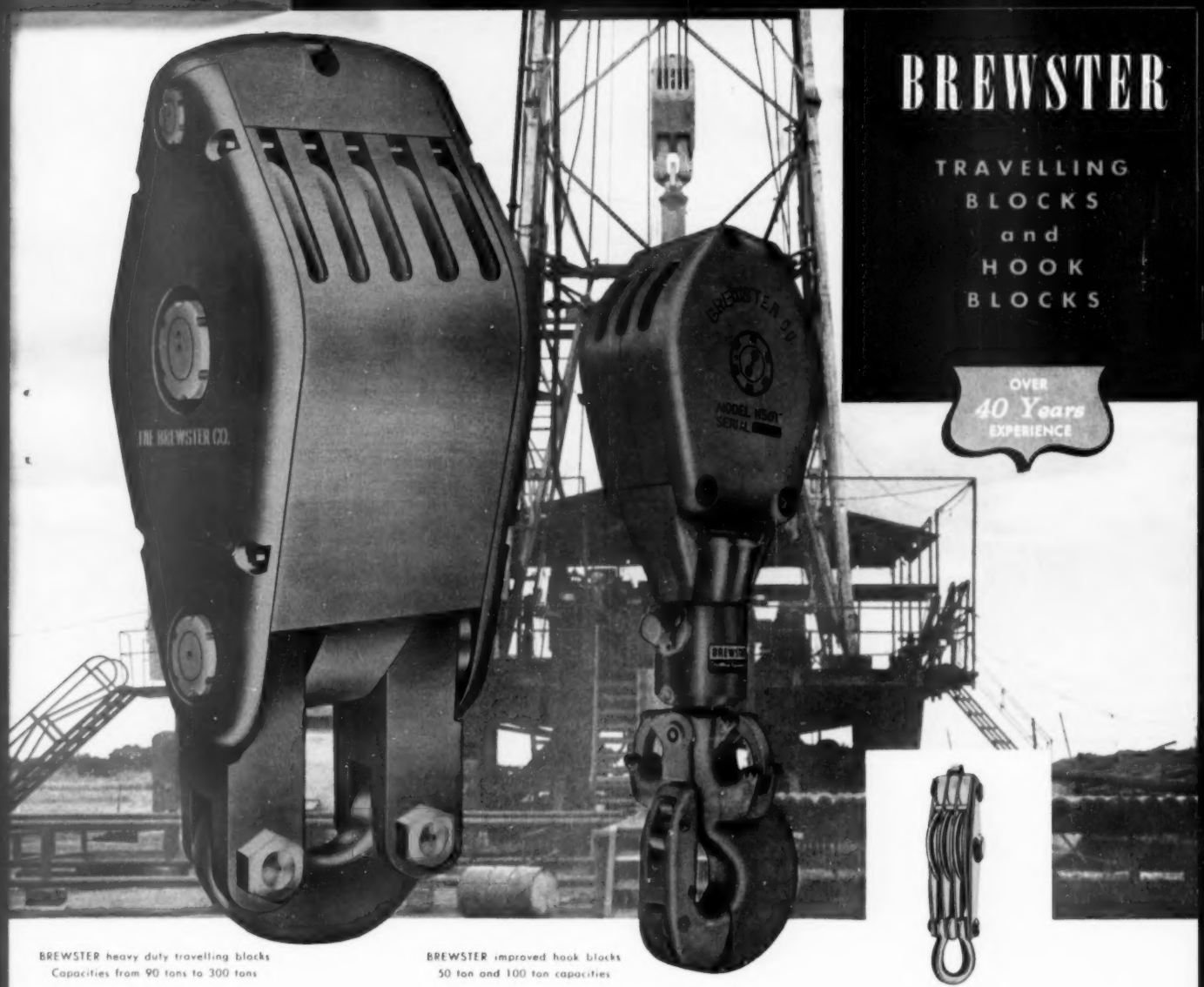
# BREWSTER

TRAVELLING
BLOCKS
and
HOOK
BLOCKS

OVER
*40 Years*
EXPERIENCE




BREWSTER heavy duty travelling blocks
Capacities from 90 tons to 300 tons

BREWSTER improved hook blocks
50 ton and 100 ton capacities

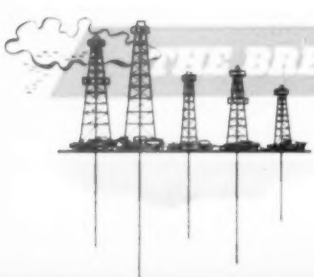


*BREWSTER 1926 model, forerunner of advanced design modern Brewster blocks.*

## *Years behind them . . . Years inside them*

OVER TWENTY-SIX YEARS OF CONTINUOUS IMPROVEMENT AND DEVELOPMENT HAVE GONE INTO THE DESIGN OF MODERN BREWSTER BLOCKS. Heavy duty bearings, accurately machined sheaves, smoothly rounded corners, low center of gravity — these are but a few of the many refinements which have put years of rugged service into Brewster blocks. Like Brewster drawworks, they are built to make drilling faster and cheaper.

*Ask your supply house for Brewster travelling blocks, hook blocks and matching crown blocks — or write us direct.*



**THE BREWSTER COMPANY, INC.**

SHREVEPORT, LOUISIANA

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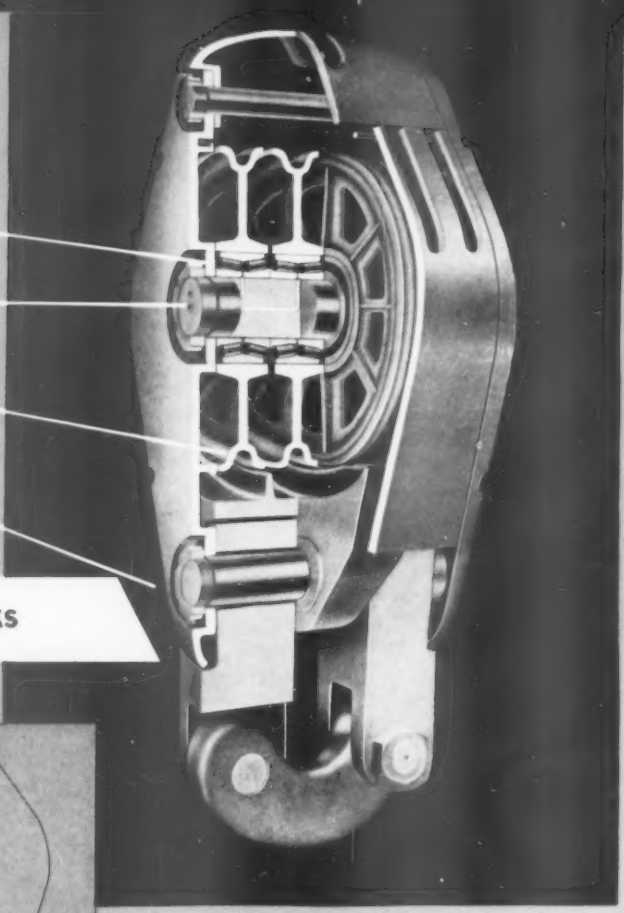
## TRAVELLING BLOCKS

**TIMKEN TAPERED ROLLER BEARINGS** eliminate side thrust on sheave hubs.

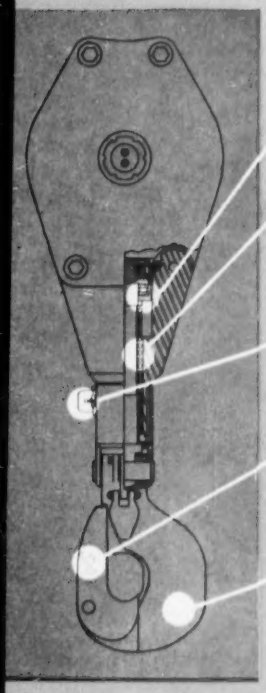
**CENTER PIN** made of heat-treated alloy steel — rifle drilled holes for lubricating individual bearings.

**SHEAVES** made of alloy steel, accurately machined to A.P.I. specifications — grooves are flame-hardened.

**ROUNDED CORNERS; COUNTER-SUNK BOLTS** permit block to travel smoothly without danger of fouling.



## LATE IMPROVEMENTS IN BREWSTER HOOK BLOCKS



100 Ton

### HOOK BLOCKS

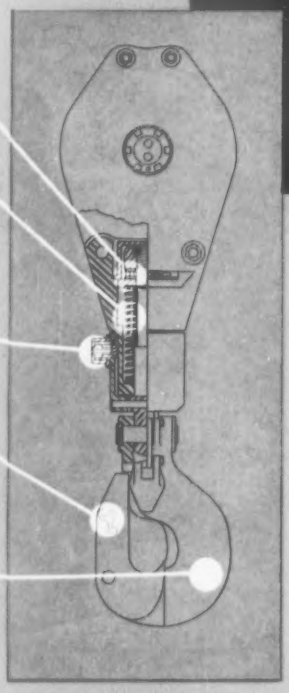
**ROLLER THRUST BEARING** permits free swiveling underload.

**STRONGER SPRING** handles increased pipe loads — pulls stand clear when unscrewing pin from box.

**IMPROVED SWIVEL LOCK** has two ears for easy operation by reach rod from derrick floor.

**IMPROVED SAFETY HOOK BILL TRIP-LOCK** cannot be accidentally jarred open — easily operated by reach rod from derrick floor.

**HEAD** made of heat-treated alloy steel — has safety factor of four to one.



50 Ton

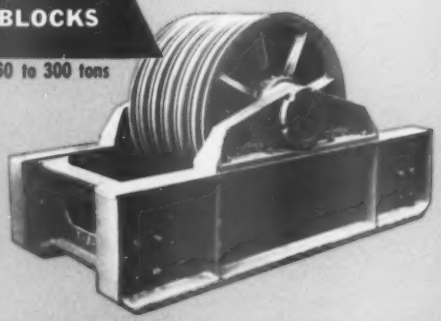
100 Ton

50 Ton

## BREWSTER ROLLER BEARING CROWN BLOCKS

Capacities from 60 to 300 tons

For straight line rise and fall of Brewster travelling blocks, match them with Brewster crown blocks. Sheaves are cast of alloy steel; grooves are machined to A.P.I. specifications and flange hardened to reduce wear. Each sheave has double-row tapered roller bearings, each individually lubricated.



THE BREWSTER COMPANY, SHREVEPORT, LOUISIANA

## WILDCAT COMPLETIONS

Ventures, Inc., 1 Government, NE SW NE 28-38s-26e. Dry. TD 5,678 ft.

### MONTANA

Carbon County: Seaboard Oil Co. 53-28-G, NW SW NE 28-8s-24e. Dry. TD 4,708 ft. Tensleep 4,608 ft.

Dawson County: Williston Oil & Gas Co. 1 Entzel, C NE NE 18-14n-55e. IPP 200 BOPD, Ordovician. TD 8,827 ft. (Ordovician discovery, new field).

Fergus County: Zach Brooks 1 Cowell, C NE NE 17-20n-25e. Dry. TD 6,249 ft. Cambrian 6,171 ft.

Musselshell County: Warren Petroleum Corp. 1 Waggner-Wallin, C SE NW 13-8n-28e. Dry. TD 9,004 ft. Ordovician 8,768 ft.

Pondera County: L. W. Winkler & Sons 1 Larson, NW NE SE 28-28n-6w. Dry. TD 3,167 ft. Madison 3,139 ft.

Rosebud County: McAlester Fuel Co. 1 NPRR, C Lot 2-Sec. 7-11n-32e. Dry. TD 4,974 ft. Heath Correlation Zone 4,750-4,840 ft.

### NORTHERN NEW MEXICO

Rio Arriba County: Stanolind Oil & Gas Co. 1 San Juan Unit 32-5 Bennet, SW SW SW 14-32n-5w. Dry. TD 4,235 ft. Temp. abd. Pictured Cliffs 3,923 ft.

### NEBRASKA

Hays County: Superior Oil Co. 88-1 Schneider, SE SE SE 1-5n-31w. Dry. TD 4,359 ft. Pre-Cambrian 4,336 ft.

### SOUTHWEST TEXAS

Atascosa County: Carter & Carter 1 Cumpian, J. H. Hardcastle Sur. 43¼, Blk. 1, A-1510. Dry. TD 4,048 ft.

Bastrop County: George J. Marott 1 Callahan, A. Meyers Sur. Dry. TD 2,710 ft.

Duval County: Argo Oil Corp. 2-E J. E. Murphy Est., BS & F Sur. 112. Dry. TD 2,615 ft.

Jake L. Hamon et al 5-D Clara Driscoll, Santa Rosalia Grant. Dry. TD 3,390 ft.

Frio County: Curtis Brothers 1 Berry, J. E. Berry Sur. 4, A-1385. Dry. TD 750 ft.

LaSalle County: Lee Brothers Oil Co. 1 Storey, H & GN Sur. 151, A-273. Dry. TD 4,740 ft.

McMullen County: W. M. Averill, Jr., et al 1 Franklin, J. B. Taylor Sur. 60, A-633. Dry. TD 5,161 ft.

Medina County: George Parker 1 Faseler et al, L. G. Harrison Sur. 799. Dry. TD 1,123 ft.

J. Simons 1 Ruskin et al, Smith Noel Sur. 42. Dry. TD 2,104 ft.

Carter & Carter 1 Duderstadt, M. T. Walters Sur. 577. Dry. TD 1,000 ft.

Milam County: W. S. Shadrack 1 Sagar, G. B. Brath Sur. Dry. TD 2,105 ft.

D. H. Byrd 1 Green, W. D. Thompson Sur. IP (casing completion) 12,500 M.c.f. daily, open flow, upper Glenrose 6,245-6,313 ft. (casing perforations), and tubing completion) 8,000 M.c.f. daily, open flow, Pettit lime 7,682-7,700 ft. (casing perforations). TD 8,212 ft. Elev. 367 ft., Midway 1,910 ft., Navarro 2,486 ft., Pecan Gap 3,785 ft., Austin 4,860 ft., Eagleford 5,125 ft., Edwards 5,700 ft., Rodessa Peak 7,925 ft. (New field.)

San Patricio County: Hawn Brothers et al 1 McRae, D. Murphy Sur., A-367. Dry. TD 3,313 ft.

Starr County: Owen & Moss 3-D Ricaby, Moss & Heard Subd. IP 9.69 BOPD, ⅛-in., 26°, casing perforations 1,679-85 ft. TD 2,810 ft. (New field, or extends El Tanque field.)

Webb County: J. Ray McDermott 1 Pedro Leal, Sur. 461. Dry. TD 3,815 ft.

Zapata County: Ralph and Dale Rowden 1 Hinnant, F. M. Makeig, Sur. 307, Certificate 669. Dry. TD 4,895 ft.

Killam & Hurd 6 Slick et al, Barroego Grant. Dry. TD 2,020 ft.

### TEXAS GULF COAST

Chambers County: Commercial Petroleum & Transport Co. 1 Williams, BBB & C Sur. 5, A-61. Dry. TD 7,057 ft.

Fayette County: E. and H. Phillips 1 Kasse, W. H. Toy Sur., A-105. Dry. TD 4,094 ft.

Fort Bend County: Third M. E. Andrews, Ltd., 1 Farmer, J. R. Farmer Sur., A-748 (Needville area). Dry. TD 7,312 ft.

Galveston County: Pan American Production Co. 1 Bogatto community, S. F. Austin Sur., A-4. Dry. TD 9,857 ft.

Jefferson County: Hudson Gas & Oil Corp. 1 Anderson, T & NO Sur. 175, Blk. 7 and 8. IP 18,000 M.c.f. daily, open flow, stray sand 9,923-31 ft. (casing perforations), and 9,600 M.c.f. daily, open flow, middle Frio 10,062-72 ft. (casing perforations). TD 10,280 ft. (new pay in Big Hill field—dual completion.)

Karnes County: Blair-Vreeland 1 Moczygemba, A. Hernandez Sur., A-4. Dry. TD 6,515 ft.

Matagorda County: J. Ray McDermott 1 Zapalac, J. H. Wade Sur. 38, A-98. Dry. TD 9,322 ft.

Orange County: Holmes Drilling Co. and W. F. Newton 1 Michael, William Stephenson Sur., A-23. Dry. TD 9,225 ft.


OILCO SPRING-MATIC LOADERS solve loading problems the world over, daily—

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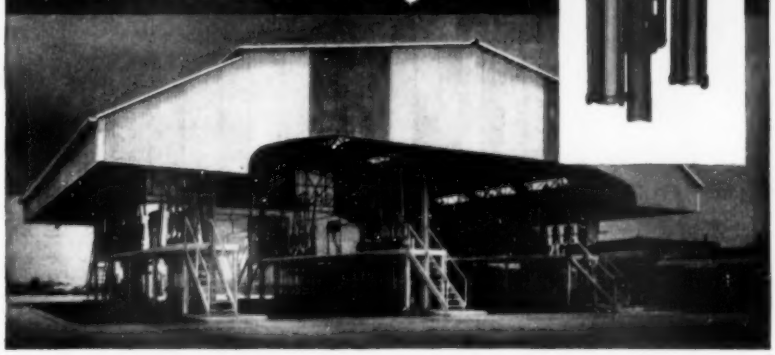

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## WILDCAT COMPLETIONS

John W. Mecom 1 First National Bank of Orange, R. Ballew Sur., A-2, IP 241.56 BOPD, 8/64-in., 38.6°, casing perforations 8,700-02 ft. TD 9,360 ft. (New field—Northwest Echo.)

Polk County: Currie B. Davis 1 Black et al, William Pace Sur. 1. Dry. TD 3,316 ft.

Wharton County: Hill & Hill et al 1 Christensen, P. J. Poole Sur. 12, A-612. Dry. TD 8,503 ft.

### EAST TEXAS

Cherokee County: Bobby Manziel 1 Faye Harris Mason, J. T. Cook Sur., A-11, 2 mi. SE Rusk. IPP 46 BOPD, 34°, Woodbine 5,084 ft. TD 5,090 ft.

Harrison County: Balter-Smith 1 H. M. Bell, S. Dickerson Sur., A-222. Dry. TD 2,575 ft.

Sells Petroleum Co. 1 Page Unit, C. Williams Sur. Dry. TD. 7,080 ft.

Red River County: W. B. Hinton 1 Richard F. Loomis Jr., Jackson Smith Sur. Dry. TD 1,838 ft.

### TEXAS PANHANDLE

Roberts County: Red River Gas Co. Co. 1 Red River-Sinclair-Lips, 8-A-H&GN. Dry. TD 9,145 ft.

### WEST CENTRAL TEXAS

Callahan County: Bridwell Oil Co. 1 C. R. McElroy, Sec. 18, Bling Asylum Lands. Dry. TD 4,000 ft.

Ralph and J. M. Hooks 1 Hook Estate, T. J. Austin Sur. 2, Blk. 2. IP 140 BOPD, 4/64-in., 46°, pay 1,684-94 ft. TD 1,717 ft.

J. J. Lynn 1 R. D. Williams, 301-5-SPRR. Dry. TD 3,312 ft.

Coleman County: C. B. Cree 1-C J. P. Morris, 63-2-GH&H. Dry. TD 2,970 ft.

McQueen & Clevenger 1 Sealy & Smith Foundation, 5-1-GH&H. Dry. TD 1,963 ft.

W. J. Murray and J. J. Collins & Co. 1 R. C. Terry, Coleman CSL 5. Dry. TD 2,754 ft.

Reigle and Henderson 1 Guthrie, J. L. Tindell Sur. 79. Dry. TD 1,051 ft.

Comanche County: The Texas Co. 1 O. B. Brinson, Amon Underwood Sur. 274, A-977. Dry. TD 3,075 ft.

Eastland County: McClung & West 2 Ed Strickland, Sec. 45, H&TC. Dry. TD 1,175 ft.

Fisher County: Texas Pacific Coal & Oil Co. 1-A Condor Petroleum Co., 6-4-W. E. Richardson Sur. Dry. TD 6,156 ft., elev. 1,866 ft., Strawn 5,140 ft., Ellenburger 6,116 ft.

Jones County: B. Baldridge & Sons, Inc., 1 Caldwell, G. Martinez Sur. 194. Dry. TD 2,515 ft.

Belcher Trust 1 F. C. Keen, Sec. 49, Deaf Smith Asylum Sur. Dry. TD 2,250 ft.

J. J. Lynn 1 Earl Wilson, Sec. 7, Orphan Asylum Lands. Dry. TD 2,878 ft.

Robinson-Puckett 1 L. W. Woodson, Sec. 18, Deaf & Dumb Asylum Lands. Dry. TD 4,760 ft.

M. D. St. John 1 Phillips Estate., League 334, Harrison CSL. IP 282 BOPD, 16/64-in., 42°, pay 3,220-28 ft. TD 3,236 ft.

Shackelford County: Falcon Oil Co. et al 1 Nail, Sec. 103, ETRR Sur. Dry. TD 1,469 ft.

Stonewall County: Donald C. Grange 1 J. W. Kennedy, 172-1-H&TC. Dry. TD 5,635 ft.

LaGloria Copr. 1 Dan C. Hill, 115-D-H&TC. IPP 81 BOPD, 39°, pay 6,258 ft. TD 6,450 ft.

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EASY "BREAK-OUT"

Exceptional non-galling and easy "break out" of drill pipe. Low friction moly-disulphide in high temperature silica grease! Use it on those extra tough jobs. JET-LUBE 21 does a remarkable job at low cost. Batch controlled. Fully guaranteed.

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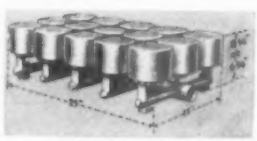
INFERNO Blue Flame
Low Pressure Gas Burner



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THE INFERNO CO.
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115 RICOU St.
SHREVEPORT, LA.

## WILDCAT COMPLETIONS

Taylor County: Warren McClung 1 Williamsan, 54-19-T&P. Dry. TD 5,093 ft.

Throckmorton County: Grisham Hunter Corp. 5-A R. W. Kelly, Sec. 29, CIR Sur., A-1249. Dry. TD 5,001 ft.

Rankin, Pitcock and Russell Maguire 3 Clementine Hardy, Sec. 259, BBB&C Sur. Dry. TD 4,535 ft.

Woodson Oil Co. 20 Jack McKnight, Blk. 2, DL&C Sur. Dry. TD 4,188 ft.

### NORTH TEXAS

Archer County: E. B. Clark 1 F. Luig, 68-3-Clark & Plumb. Dry. TD 4,050 ft.

Double I. Drilling Co. 1 S. Wolf, 31-4-Clark & Plumb, Dr. TD 1,140 ft.

George W. Graham 1 Ferguson 2-A1148-SPRR. IPP 5 BOPD, 38°, pay 1,760 ft. TD 1,785 ft.

Hunter Co., Inc. 2 Adam Furr, Blk. 10, A-113, Dallas CSL. Dry. TD 5,005 ft.

Magnolia Petroleum Co. 1-A Miller, Blk. 19, ATNCL. Dry. TD 103 ft.

Timberlake, Kelleher & Scott 5 Prideaux-Hand, J. J. Hand Sur., A-181. IP 240 BOPD, ¾-in., 42°, Strawn pay 3,038 ft. TD 3,048 ft.

Lewis W. Welch 1-C Key, A. J. Richardson Sur., A-356. Dry. TD 5,466 ft., Ellenburger 5,456 ft.

Woodson Oil Co. 4 G. A. Key, Blk. 25, J. M. Taylor Sur., A-648. Dry. TD 1,329 ft.

Baylor County: H. H. Holliday 1 Jessie Lee Hargrove, Blk. 3138, TE&L. Dry. TD 1,464 ft.

Gray & Metcalf 1 Roy Stine, Blk. 66, Bacon Subd. Dry. TD 990 ft.

S. D. Johnson 1 J. P. Strawhorn, T. F. Johnson Sur., A-762. Dry. TD 3,392 ft.

Cooke County: T. P. Frost 1 John Fette, BBB&C Sur., A-162. Dry. TD 1,968 ft.

G. E. Kadane & Sons 1 S. W. Cook, Ed Wingate Sur., A-1150. Dry. TD 5,610 ft., Simpson 5,406 ft., Oil Creek sand 5,472 ft.

Jay Simmons 1 E. A. Stanley, John De Marcus Sur., A-314. IPP 19 BOPD, 29°, pay 3,111-15 ft. TD 3,120 ft.

Foard County: Service Drilling Co. 1 Milburn Carroll, Blk. A, H&TC. Dry. TD 5,230 ft.

Grayson County: B. M. Hester & Son 1 C. Furche, M. L. Baker Sur., A-1253. Dry. TD 6,408 ft. Ellenburger 6,175 ft.

B. M. Hester 1 J. G. Huff, Manuel Manchaca Sur., A-783. IP 127 BOPD, 28°, ¼-in., Strawn sand 5,660 ft. TD 6,078 ft.

McElreath, Suggett, Brown & Wheeler 1 F. H. Smith, S. A. Long Sur., A-708. Dry. TD 7,012 ft.

Shaw & Grace 1 J. E. Anderson, Joseph Morrison Sur., A-793. Dry. TD 5,615 ft.

Sinclair Oil Co. 2 J. F. Godwin, W. C. Caruthers Sur., A-209. IP 764 BOPD, ½-in., 31°, sand pay 8,923-58, 8,965-75 ft. TD 9,015 ft. Second well, new pay.

Superior Oil Co. 1-A Weldon Cooper, J. Alameda Sur., A-33. Dry. TD 10,066 ft.

Jack County: Ada Oil Co. 1 Castle Bros., Blk. 14, M. Putnam Sur., A-465. Dry. TD 4,062 ft.

R. W. Darden 1 Christian, Blk. 12, M. Rockerfellow Sur., A-484. Dry. TD 770 ft.

Ralph Harper 1 Loving Estate, TE&L Sur. 3347, A-836. IP 240 BOPD, 18/64-in., 40°, pay 4,403 ft. TD 4,871 ft.

Leatherwood Drilling Co. and Barham Bros. 1 John Smith, Blk. 9, Navarro CSL, A-443. IP 120 BOPD, 18/64-in., 42°, pay 2,989 ft. TD 3,000 ft.

Neeld & Hood Drilling Co. 3 S. E. Maxey, SPRR Sur., A-568. Dry. TD 535 ft.


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3. FIRST in CAPACITY
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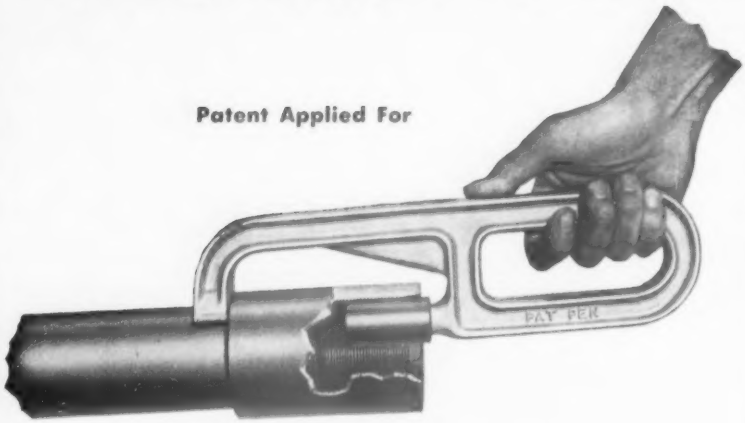
Patent Applied For



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MAGNETOS ZC ENGINES MOTORS PUMPS DIESELS


## WILDCAT COMPLETIONS

Ted A. Norwood 1 J. R. Clayton, TE&L Sur. 3334. Dry. TD 3,361 ft.

Knox County: Union Oil Co. of California 1 G. H. Beavers, 229-44-H&TC. Dry. TD 6,518 ft.

Montague County: Miami Operating Co., Inc. 1 Montague County Poor Farm, J. Westmoreland Sur., A1328. IP 120 BOPD, 12/64-in., 41°, conglomerate pay 6,501 ft. TD 6,555 ft.

Wilbarger County: C. B. Morris Drilling Co. 1 M. V. McNairn, 6-8-H&TC. Dry. TD 3,707 ft.

John & Pat O'Neil 1-W Waggoner, 4-5-H&TC. Dry. TD 2,436 ft.

Wm. L. Snoddy 1 George Striet, 9-18-H&TC. Dry. TD 2,100 ft.

Wise County: Westbrook Oil Corp. 1 Mrs. N. P. Pace, John Jordan Sur., A-457. Dry. TD 5,525 ft.

Young County: Consolidated Oil Co. 1-B Stewart, 2785-A2066-TE&L. IP 128 BO in 12 hr., 24/64-in., 42°, Vogtsberger sand pay 3,433 ft. TD 3,440 ft.

Merle F. Gunby 1 J. P. Tackett, Blk. 17, R. F. Mitchell Sur. 631, A-2244. Dry. TD 2,323 ft.

Woodson Oil Co. 1 H. L. Robertson, F. L. Green Sur., A-105. Dry. TD 4,751 ft.

### WEST TEXAS

Andrews County: Anderson-Prichard Oil Corp. 1-E University, 7-7-University Lands. IP 3,353 BOPD, open 2-in. tubing, 44°, Devonian 12,326 ft., elev. 2,994 ft. TD 13,700 ft.

Sun Oil Co. 1 Maggie Shepherd-State,3-A46-PSL. IPP 70 BOPD, 34°, pay 4,294 ft. TD 4,710 ft.

Borden County: Helmerich & Payne, Inc. 1 Doward, 10-32-T5N-T&P. Dry. TD 9,970 ft., elev. 2,942 ft., Devonian 9,884 ft., Ellenburger 9,950 ft.

Crane County: T. M. Evans 1 Jordan-Ingram, 12-22-PSL. IP 242 BOPD, 10/64-in., 40°, Pennsylvanian 7,830 ft. TD 9,068 ft.

Crockett County: Haynes and V. T. Drilling Co. 1 University (Ohio), 4-50-University. IP 65 BOPD, pay 2,215 ft. TD 2,515 ft.

Haynes and V. T. Drilling Co. 1 University (Warren), 9-50-University. IP 69 BOPD, ¼-in., 33°, pay 2,242 ft. TD 2,510 ft.

E. H. Shaw 1 Mrs. Nettie Holt, 14-OP-GC&SF. Dry. TD 1,365 ft.

Hockley County: Sunray Oil Corp. and Zephyr Oil Corp. 1 C. T. Pace, 13-33-Baylor CSL. IPP 93 BOPD, 29°, pay 6,372 ft. TD 7,572 ft.

Howard County: Goldston Oil Corp. 1 Claude Collins, 6-31-T2N-T&P. Dry. TD 8,002 ft., elev. 2,706 ft., reef 7,945 ft.

Pecos County: Thomas T. Ellsworth 1-B Simmons, 26-9-H&GN. IP 36 BOPD, 43°, Ellenburger 5,780 ft. TD 5,924 ft.

Phillips Petroleum Co. 1-E Puckett, 38-101-TCRR. IP 13,757 M.f.g., trace distillate, Ellenburger pay 14,500-15,000 ft., elev. 3,437 ft., Ellenburger 13,410 ft., pre-Cambrian 15,045 ft. TD 15,075 ft.

Reagan County: Phillips Petroleum Co. 1-A Kenneth, 16-F-C&MRR. IP 99 BOPD, 17/64-in., Spraberry pay 6,111 ft., TD 11,043 ft.

Runnels County: Southern California Petroleum Co. 1 S. M. Smallwood, Wharton CSL Sur. 516. Dry. TD 4,363 ft.

Schleicher County: Richard King, Jr. and John Eisner 1 Ben Meckel, 66-TT-GC-&SF. Dry. TD 7,215 ft., elev. 2,241 ft. Ellenburger 6,820 ft.

Tom Green County: W. C. Kinkel 3 J. E. Hall, N. Kimbrough Sur. 8. IPP 20 BOPD, pay 1,127 ft. TD 1,131 ft.

Upton County: Buffalo Oil Co. 1 King Ranch, 24-35-H&TC. IP 166.5 BOPD, 8 64-in., 35°, pay 4,783 ft. TD 5,532 ft.

### SOUTHEAST NEW MEXICO

Lea County: Amerada Petroleum Corp. 1 Lois C. Hobbs, 3-14s-37e. Dry. TD 11,754 ft., elev. 3,873 ft., Wolfcamp 9,700 ft., Pennsylvanian 10,362 ft.

George P. Livermore 1 State 28, 28-17s-37e. Dry. TD 5,343 ft.

Southern Union Gas Co. 1 Parcell-Federal, 19-21s-38e. IP 288 BOPD, ¾-in., 37°, Abo pay 7,310 ft.

### INDIANA

Daviess County: Graham Development Co. 1 Capehart, NE NW NE 32-4n-7w. Dry. TD 1,152 ft.

Dubois County: N. W. Strange 1 Niehaus, SE SE SW 23-3s-6w. Dry. TD 1,150 ft.

A. W. Barnett 1 L. H. Barnett, NE NW NE 13-3s-6w. Dry. TD 1,160 ft.

R. L. Tilton 1 Werremeyer, NW NE NE 1-3s-6w. Dry. TD 1,167 ft.

Gibson County: Miami Operators, Inc. 1 Redman, SW SW SW 28-3s-12w. Dry. TD 2,360 ft.

J. L. Black 1-A Manning, SE NW SE 32-2s-9w. Dry. TD 2,000 ft.

D & M Oil Co. 1 Newkirk, SE SW NW 32-2s-8w. Dry. TD 1,616 ft.

Pike County: Willis & Wise 1 Nuhring, SE SE SE 15-3s-7w. Dry. TD 1,206 ft.

R. D. Brown 1 Hicks, E½ NE SW 24-1s-7w. Dry. TD 1,813 ft.

Cecil Tedrow 1 Cockerham-Donbarlahr, SW NW NE 12-1n-8w. Dry. TD 1,311 ft.

Posey County: Calvert Drilling Co. 1 Keck, NW SE NW 34-6s-13w. Dry. TD 2,910 ft.

Spencer County: Simon Lebow 1 Scamahorn, SW SW NW 11-7s-6w. Dry. TD 1,500 ft.

Sullivan County: Superior Drilling Co. 1 Blackford, NE SW NE 29-9n-9w. Dry. TD 1,062 ft.

### ILLINOIS

Bond County: The Texas Co. 1 Andrews, SW NE SW 2-4n-3w. Dry. TD 3,393 ft.

Christian County: Welker Oil Co. 1 Meyers, SW NE NW 30-13n-1w. Dry. TD 2,315 ft.

Clark County: S. B. Griffith 1 Dickinson, NE NW SW 24-9n-13w. Dry. TD 892 ft.

Cumberland County: R. Hurst 1 Edens, NE NW SE 30-10n-11e. Dry. TD 1,403 ft.

Hamilton County: Davis and Hose 1 Scrivner, NW NE NW 22-5s-5e. Dry. TD 2,703 ft.

Calvert Drilling Co. 1 Barnett, NW SW SE 2-5s-5e. Dry. TD 3,530 ft.

Madison County: O. R. Shull 1 Albrecht, SW SW SW 12-6n-7w. Dry. TD 673 ft.

Marion County: H. C. Sanders 1 Elliott, SE NW NE 2-1n-2e. Dry. TD 2,252 ft.

Randolph County: Jet Oil Co. 1 Dickey, SW SE NE 19-4s-5w. Dry. TD 1,130 ft.

St. Clair County: A. Schiermann 1 Haas, NW SE NW 22-2n-6w. Dry. TD 1,134 ft.

Washington County: Inland Oil Co. 1 May, NE SE NE 1-3s-3w. Dry. TD 1,533 ft.

T. S. Doran 1 Roznowski, NE NW SW 19-3s-1w. Dry. TD 1,289 ft.

### MICHIGAN

Barry County: Merrill Drilling Co. 1 Yeomans, SE NE SE 30-4n-10w. Dry. TD 2,007 ft. in Traverse.

Kalamazoo County: Merrill Drilling Co. 1 Labadie, NE SE SW 4-2s-12w. Dry. TD 1,481 ft. in Traverse.

Mason County: Augie Busk and Carl Grimes 1 Barothy et ux, NW NE NW 36-17n-16w. AIP 100 bbl., restricted flow, Dundee 2,287 ft. Pay 2,289-90 ft. TD 2,290 ft. (Extends Eden pool ½ mile southeast.)

Associated Drillers & Producers, Inc. 1 Brye, NW NE NW 16-17n-17w. Dry. TD 1,715 ft. in Traverse.

Missaukee County: Brazos Oil & Gas Co. DM-1 Brazos-Pure State et al, NE NE NW 30-24n-6w. Dry. TD 2,950 ft. in Traverse.

Muskegon County: Max Spidel L-A Kubik & Bolt, NE NE SW 27-9n-14w. Dry. TD 2,500 ft. in Dundee.

Osceola County: Edwin C. Meredith 1 Diehlman & Rose, SW NE NW 3-18n-8w. Dry. TD 2,036 ft. in Marshall.

### KENTUCKY

Daviess County: George Nelson 1-A Hite, SE NW SW 7-O-31. Dry. TD 1,002 ft.

J. C. Ellis 2 Calhoun, SE SE SE 12-O-26. Dry. TD 2,364 ft.

Henderson County: Basin Drilling Co. 1 Fellows, NW SW SE 25-P-23. Dry. TD 2,732 ft.

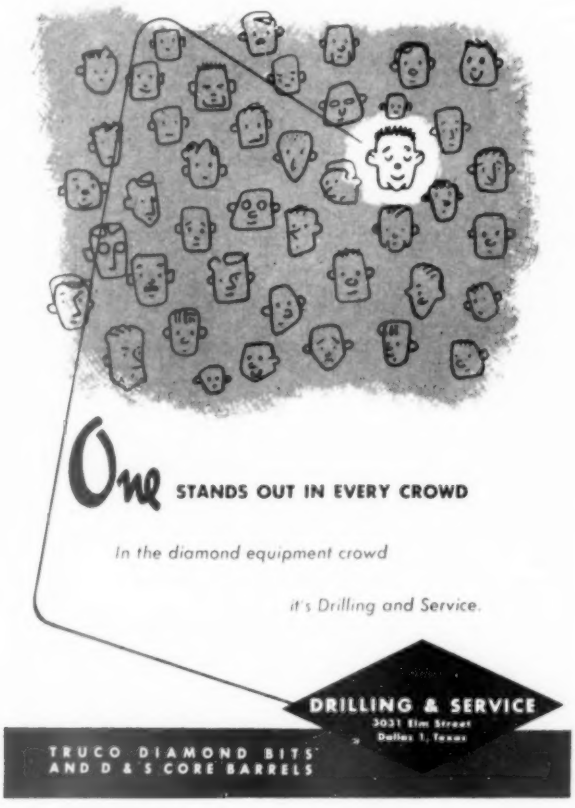
Coy Oil Co. 1 Wilson, SW NW NW 21-P-21. Dry. TD 2,708 ft.

### PENNSYLVANIA

Clearfield County: Manufacturers Light & Heat Co. 2 State of Pennsylvania (Tract C), Penfield Quadrangle, Sec. F, 2,800 ft. N of S line, 10,500 ft. E of W line. Dry. 8D 7,232 ft. in Helderberg limestone.

Clinton County: Deep Rock Oil Corp. 1 Walizer, located ½ Mile east of town of Loganton. Dry. TD 4,532 ft. in Upper Cambrian.

Wyoming County: John Rebold 1 John Sheehan, Meshoppen Quadrangle, Sec. E,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THE OIL AND GAS JOURNAL

**"He spent a gob of money on that new chlorophyll—until he got wise that nobody liked him anyway."**

## WILDCAT COMPLETIONS

12,000 ft. N of S line, 1,000 ft. E of W line. Dry. TD 8,593 ft. in Helderberg limestone.

### FLORIDA

Hendry County: Commonwealth Oil Co. 2 Red Cattle, C NE NE 25-45s-28e. Junked hole. TD 2,445 ft.

Walton County: A. R. Temple 2 Harbeson, C NW NW 15-3n-19e. Dry. TD 4,973 ft. Elev. 228 ft., Eutaw 3,912 ft., marine Tuscaloosa 4,382 ft., lower Cretaceous 4,970 ft.

### ALABAMA

Clarke County: I. P. and Fred La Rue 1 Dial, C NE SW 4-11n-1e. Dry. TD 3,567 ft. Elev. 93 ft., Chalk 1,250 ft., Eutaw 2,378 ft., marine Tuscaloosa 3,260 ft., Massive 3,460 ft.

Lamar County: W. T. Durant 1 Ogden, C NE NW 6-14s-15w. Dry. TD 3,007 ft. Elev. 378 ft., Millerella 2,207 ft., Carter 2,330 ft., Lewis 2,840 ft., Iowa 2,977 ft.

Pike County: R. W. Williams 1 Holmes, C SE SE 24-12n-21e. Dry. TD 1,400 ft.

Sumpter County: Blair Oil & Gas Co. 1 Allison, C SW NE 25-17n-2w. Dry. TD 4,010 ft. Elev. 134 ft., marine Tuscaloosa 2,250 ft., lower Tuscaloosa 2,320 ft., Massive 2,480 ft., lower Cretaceous 2,722 ft., Cotton Valley 3,550 ft., Pennsylvanian 3,960 ft.

### MISSISSIPPI

Clarke County: Gulf Refining Co. 1-A Brock, C SW SW 5-10n-6w. Dry. TD 4,765 ft. Elev. 302 ft., Midway 2,563 ft., Chalk 3,142 ft., Eagle Ford 4,298 ft., Stanley 4,441 ft.

Franklin County: Durbin Bond & Co. et al 1 Seab heirs, 11-6n-2e. Dry. TD 6,761 ft. Elev. 318 ft., Wilcox 4,316 ft., base Baker shale 6,114 ft.

Jefferson County: Calto Oil Co. et al 1 Baker, 40-9n-1w. Dry. TD 6,006 ft. Elev. 187 ft., Wilcox 3,720 ft., base Baker shale 5,563 ft.

Wilkinson County: Atlantic Refining Co. 2 Wax-Morgan, 23-3n-3w. Dry. TD 7,484 ft. Elev. 67 ft. (Stratigraphic test.)

### SOUTH LOUISIANA

Plaquemines Parish: Shell Oil Co. 2 State Lease 1762, 19-16s-16e. IP 1,096 M.c.f. daily, 10/64-in., casing perforations 9,408-14 ft., 9,417-22 ft., and 9,429-30 ft. TD 10,305 ft. (New pay in Lake Camp field.)

Humble Oil & Refining Co. 5 State Lease 2090 (Hole 2), Southeast Pass. IP 568 M.c.f., various chokes, casing perforations 2,674-84 ft. TD 8,616 ft. (New pay in Southeast Pass field.)

F. A. Callery, Inc., 1 Hero unit, 2-15s-24e. IP 218 BOPD, 9/64-in., 40.2°, casing perforations 7,512-15 ft. TD 11,533 ft. (New pay in Stella field.)

Terrebonne Parish: The Texas Co. 3-B Bay Junop unit, 15-21s-14e. IP 276 BCPD and 11,828 M.c.f. daily, ¾-in., 46.1°, casing perforations 13,774-80 ft. TD 14,557 ft. (New pay in Bay Junop field.)

### NORTH LOUISIANA

Bossier Parish: Stanolind Oil & Gas Co. 2 Biedenharn, C SW NE NE 22-21n-14w. Dry. TD 2,969 ft.

Grant Parish: Columbia Carbon Co. 1 Dunca, 51-6n-3w. Dry. TD 6,815 ft.

### ARKANSAS

Lafayette County: Burnett Producing Co. 1 Odessa Cole Unit "A," C NE SW SW 34-15s-24w. Dry. TD 2,860 ft.

Ouachita County: McAlester Fuel Co. 2 McGaughey "A," 777 ft. S and 948 ft. E NWc 6-15s-18w. Dry. TD 2,678 ft.

Union County: Pan Am Southern Corp. 1 McGough, C SE NW SE 20-17s-13w. Dry. TD 3,602 ft.

### OKLAHOMA

Atoka County: Buck Drilling Co. 1 Melton, S½ SE SE SE 4-1s-14e. Dry. TD 1,120 ft.

Creek County: Curt D. Edgerton 1 Klintworth, SW SE NW 10-19n-8e. Dry. TD 2,552 ft.

Garfield County: Anderson-Prichard Oil Corp. 1 Kroll, SW SW SW 2-22n-4w. Dry. TD 5,275 ft.

Toklan Production Co. 1 Blaser, SW SW NE 17-23n-4w, IPF 131½ BOPD 6,577 M.c.f. of gas per day, Mississippi lime 5,462-83 ft. TD 6,216 ft. (Mississippi lime discovery.)

Garvin County: Wm. H. Pine 1 Keel, NW SW NE 35-4n-3e. Dry. TD 2,376 ft.

Jefferson County: Lovella Rather et al 1 Dobbins, W½ SW SW SW 28-3s-6w. Dry. TD 204 ft.

Harry Kathis 1 Price & Short, NW NE SW 3-4s-7w. Dry. TD 1,740 ft.

Lincoln County: Blackwell Oil & Gas Co. et al 1 Henson, SE SE NW 4-13n-3e. IPF 95 BOPD, lower Skinner sand 4,437-43 ft., 38°, TD 4,443 ft. (New pay discovery and ¾-mile northeast extension to Happy Hill.)

E. L. Oliver 1 Overman, SW SW NE 28-14n-2e. IPF 85 BOPD, Stray sand, 3,796-3,814 ft., 1,456 M.c.f. of gas per day, 49°, 25/64-in. TD 3,861 ft. (Discovery.)

Love County: W. F. Turner 1 Cecil, SW SW SW 28-7s-2w. Dry. TD 7,007 ft.

McCurtain County: Jack Woolsey 1 Smith, SW NW SW NW 4-8s-23e. Dry. TD 343 ft.

Robin H. Brians 1 Griffin, C 20-8s-23e. Dry. TD 1,638 ft.

Braton R. Boecher 1 Dillard, NE SW NW 1-8s-24e. Dry. TD 353 ft.

Osage County: Fitzhugh & Weimer 1 Osage, NE NE SW 15-23n-6e. Dry. TD 3,045 ft.

B. R. Albert 1 Osage, SW SW NE 20-26n-7e. Dry. TD 2,892 ft.

Pottawatomie County: Kenneth A. Ellison 1 Urbansky, SW NE SE 27-7n-3e. Dry. TD 5,245 ft.

### KANSAS

Barton County: Pabco 4 Thill, CEL SE NW 28-19s-11w. IPP 83 BOPD, Arbuckle 3,329-47 ft. TD 3,347 ft. (New pay at Thill pool.)

Clark County: I. W. Siegel et al 1 Theis, NE NE SW 18-34s-24w. IP 9,800 M.c.f. of gas per day, Chester 5,666-84 ft. TD 5,830 ft. (Discovery.)

Comanche County: United Producing Co. 1 McCrary, C NW SE 35-31s-18w. Dry. TD 6,051 ft. Arbuckle 5,982 ft.

Dickinson County: Beardmore 1 Book, SW SW SW 24-15s-2e. Dry. TD 2,415 ft.

El Dorado 1 Keining, NW NW SE 5-16s-4e. Dry. TD 2,313 ft.

Marion County: J. Razook 1 Gillett, CEL E½ SW 5-22s-3e. Dry. TD 2,858 ft.

Uhl-Davis & Sanders 1 Poe, NW NE SE 16-22s-3e. Dry. TD 2,880 ft.

Pawnee County: Natural Gas & Oil 1 Rutherford, NE SW NW 25-23s-16w. Dry. TD 4,250 ft.

Pratt County: Skelly Oil Co. 1 Eubank, NW NW SE 32-29s-14w. Dry. TD 4,755 ft.

Rice County: Hinkle 1 Eatinger, NE NE NW 32-20s-10w. Dry. TD 3,361 ft.

Sheridan County GMR 1 Sheetz, SE NE SE 35-7s-26w. Dry. TD 4,080 ft.

Stafford County: Welch & Olsson 1 Koelsch, SW SW NW 3-24s-14w. Dry. TD 4,254 ft.

Sumner County: Bowman & Grismore 1 Stephens, SW SW NE 36-33s-2e. Dry. TD 3,360 ft.

Alpine 1 Roy, SW SW SE 5-34s-2w. Dry. TD 4,582 ft.

### CALIFORNIA

*Kern County: Ferguson & Bosworth 13 Layman, SE SE 18-28s-20e, IPF 280 BOPD, 42°, 12/64-in., perforations 2,509-79 ft., deepened from 2,100 ft., new TD 3,580 ft. (New Point of Rocks Eocene pool in McDonald Anticline area.)

Franco Western Oil Corp. 1 Oceanic-Galbreath, 22-25s-18e. Dry. TD 2,003 ft.

Golden Bear Oil Co. 2 Duke, 28-29s-27e. Dry. TD 4,472 ft.

* Standard Oil Co. of California 16 Well, NW SW 29-26s-21e, IPP 177 BOPD, 32° gravity, perforations 6,020-49 ft., TD 8,200 PB 6,050 ft. (Deeper pool discovery in Lost Hills field, top Carneros 6,022 ft., elev. 420 ft.)

* The Texas Co. 1 Arvin Unit, NW NE 26-31s-29e, IPF 15 BO in 5 hours, 12/64-in., 33.2°, perforations 6,960-7,039 ft., TD 7,048 ft. (North extension to Arvin field.)

Tide Water Associated Oil Co. 63-8 S.F. & F.L., 8-25s-20e. Dry. TD 5,530 ft.

Los Angeles County: Teater Petroleum, Ltd. 1 Mary Austin, 28-6n-17w. Dry. Deepened from 3,647 ft., new TD 6,902 ft.

Orange County: Ione Petroleum Co. 4 Farnsworth, 12-6s-11w. Dry. TD 2,465 ft.

Riverside County: Beaumont Exploration Co. 1 John Drew, 12-3s-1w. Dry. TD 2,215 ft.

San Benito County: D.H.M. Oil Co. 1 D.H.M., 8-20s-12e. Dry. TD 3,022 ft.

San Luis Obispo County: Terry Drilling Co. 1 U. S.-Kane, 7-31s-21e. Dry. TD 4,803 ft.

### MANITOBA

McKee 1, LSD 1, 15-3-25w1. Dry. TD 2,986 ft.

### SASKATCHEWAN

Amurex-Albercan 1 Big Stick Lake, LSD 10, 27-15-24w3. Dry. TD 3,450 ft.

Tide Water-Claydon 5-20 Crown, LSD 5, 20-2-21w3. Dry. TD 4,770 ft.

Tide Water-Arcola 1 Crown, LSD 1, 22-8-4w2. Dry. TD 4,893 ft.

Tide Water 15-17 Eastend Crown, LSD 15, 17-6-20w3. Dry. TD 4,845 ft.

British-American-Husky-Phillips 1 Glenavon, LSD 8, 29-13-9w2. Dry. TD 3,744 ft.

Sun-Christie 7-16 Gravelbourg, LSD 7, 16-9-4w3. Dry. TD 7,660 ft.

Superior-Bata et al 4 Manito, LSD 15, 2-42-28w3. Dry. TD 2,437 ft.

Socony-Woodley-Southern 25-8 Wheat Valley, LSD 8, 25-17-17w3. Dry. TD 3,490 ft.

### ALBERTA

Union Oil Co. 8-16 Grant, LSD 8, 16-43-13w4. Dry. TD 4,183 ft.

British-American-Pacific 14-16 West Leduc, LSD 14, 16-50-27w4. Dry. TD 6,600 ft.

Husky 2 Earlie, LSD 4, 26-48-3w4. Dry. TD 2,373 ft.

Husky 1 Koknee, LSD 12, 23-49-5w4. Dry. TD 2,025 ft.

Canpet-Fina 2 Manville, LSD 10, 10-52-9w4. Dry. TD 2,522 ft.

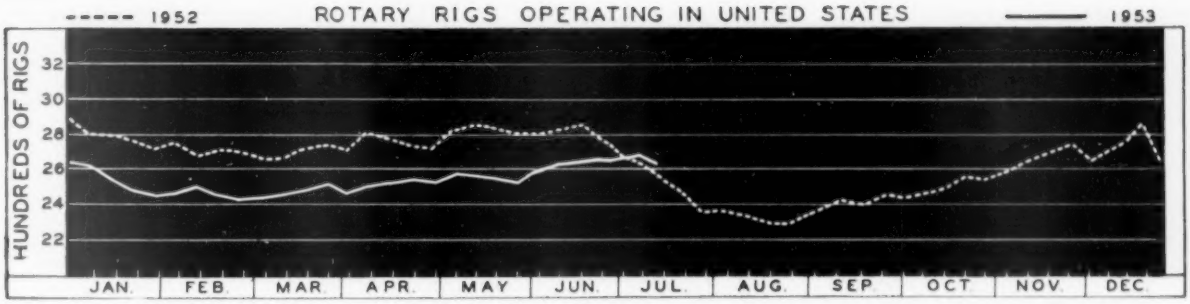
Hudson's Bay 1 Lone Pine, LSD 16, 21-32-28w4. Dry. TD 8,435 ft.

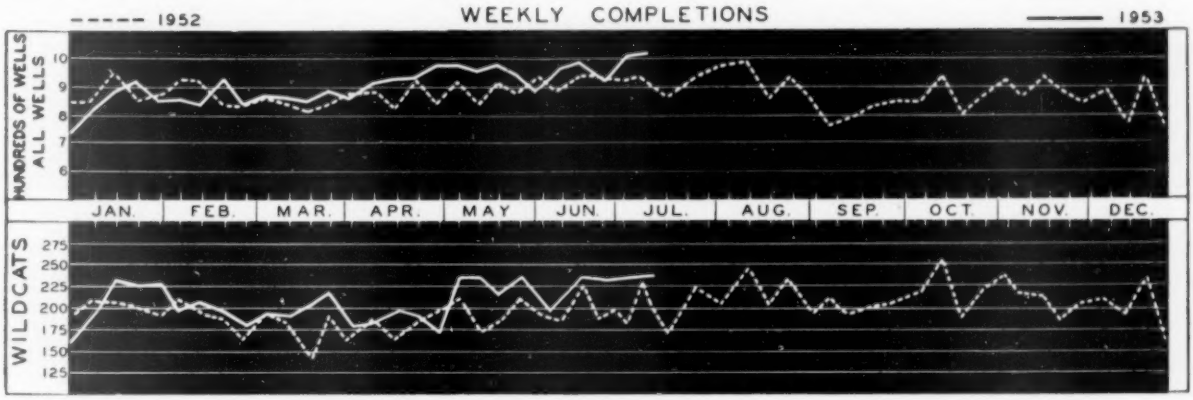
Shell Oil Co. 1 Parkland, LSD 6, 29-15-26w4. Dry. TD 9,250 ft.

Royalite 2 Peavey, LSD 7, 34-56-25w4. Dry. TD 4,475 ft.

Amerada Petroleum Corp. "J" F 24-11 Crown, LSD 3, 11-71-24w5. Dry. TD 10,128 ft.

(Continued on page 199)



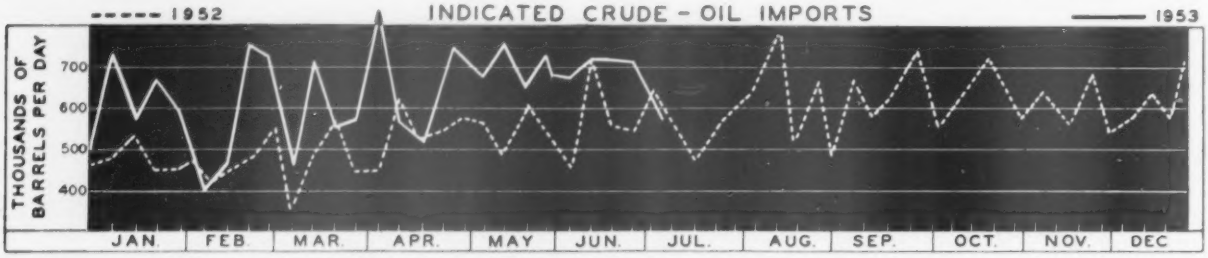

# CURRENT STATISTICS

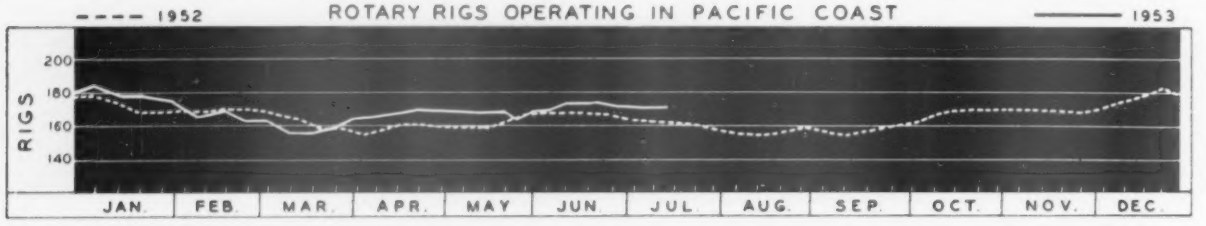
## EXPLORATION

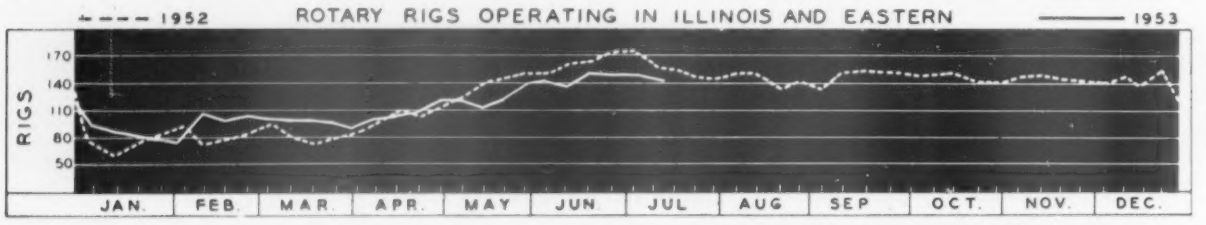
### WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 11, 1953

| | Total of all wells | | | | | July 11 | | Wildcat completions and discoveries | | | | | Cumulative total, 1953 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Comp. | Oil | Gas | Dry | Footage | 1953 | 1952 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 16 | 8 | 0 | *8 | 23,700 | 364 | 416 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 36 | 19 | 4 | †13 | 61,401 | 890 | 951 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 11 | 14 |
| West Virginia | 7 | 1 | 5 | 1 | 21,102 | 318 | 322 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | 8 |
| Ohio | 17 | 8 | 2 | ‡7 | 37,416 | 528 | 532 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 10 | 12 |
| Indiana | 32 | 10 | 0 | 22 | 54,610 | 646 | 615 | 0 | 0 | 0 | 13 | 13 | 9 | 0 | 2 | 166 | 177 |
| Kentucky | 21 | 6 | 6 | 9 | 47,023 | 552 | 701 | 0 | 0 | 0 | 4 | 4 | 6 | 0 | 1 | 100 | 107 |
| Illinois | 41 | 20 | 0 | 21 | 105,109 | 933 | 937 | 0 | 0 | 0 | 12 | 12 | 4 | 0 | 0 | 204 | 208 |
| Michigan | 16 | 9 | 0 | 7 | 39,842 | 291 | 360 | 1 | 0 | 0 | 6 | 7 | 10 | 0 | 4 | 115 | 129 |
| Kansas | 93 | 55 | 5 | ‡33 | 304,733 | 2,579 | 2,515 | 1 | 0 | 1 | 12 | 14 | 59 | 0 | 22 | 398 | 479 |
| Nebraska | 8 | 5 | 0 | 3 | 40,459 | 167 | 129 | 0 | 0 | 0 | 1 | 1 | 12 | 0 | 2 | 68 | 82 |
| Oklahoma | 169 | 106 | 5 | §58 | 515,675 | 3,776 | 3,079 | 2 | 1 | 0 | 13 | 16 | 63 | 5 | 18 | 340 | 426 |
| Texas | 331 | 194 | 14 | 123 | 1,501,120 | 9,076 | 9,685 | 25 | 1 | 1 | 80 | 107 | 469 | 34 | 103 | 2,196 | 2,802 |
| North Central (Dist. 7-B & 9) | 142 | 77 | 0 | 65 | 504,414 | 3,388 | 3,032 | 12 | 0 | 0 | 46 | 58 | 249 | 0 | 10 | 901 | 1,160 |
| West (Dist. 7-C & 8) | 74 | 56 | 2 | 16 | 376,452 | 1,958 | 3,034 | 10 | 0 | 1 | 5 | 16 | 97 | 2 | 8 | 338 | 445 |
| Panhandle (Dist. 10) | 17 | 10 | 5 | 2 | 57,539 | 427 | 360 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 15 | 17 |
| Eastern (Dist. 5 & 6) | 13 | 4 | 0 | 9 | 47,250 | 425 | 477 | 1 | 0 | 0 | 3 | 4 | 13 | 2 | 4 | 142 | 161 |
| Gulf Coast (Dist. 2 & 3) | 40 | 22 | 4 | 14 | 278,639 | 1,347 | 1,449 | 1 | 0 | 0 | 10 | 11 | 57 | 11 | 43 | 350 | 461 |
| Southwest (Dist. 1 & 4) | 45 | 25 | 3 | 17 | 236,826 | 1,531 | 1,333 | 1 | 1 | 0 | 15 | 17 | 53 | 17 | 38 | 450 | 558 |
| Louisiana | 54 | 33 | 4 | 17 | 325,565 | 1,333 | 1,210 | 1 | 1 | 2 | 2 | 6 | 36 | 19 | 13 | 185 | 253 |
| Northern | 29 | 19 | 1 | 9 | 75,804 | 533 | 634 | 0 | 0 | 0 | 2 | 2 | 4 | 1 | 2 | 62 | 69 |
| Southern | 25 | 14 | 3 | 8 | 249,761 | 800 | 576 | 1 | 1 | 2 | 0 | 4 | 32 | 18 | 11 | 123 | 184 |
| Arkansas | 9 | 5 | 0 | 4 | 32,164 | 234 | 206 | 0 | 0 | 0 | 3 | 3 | 6 | 0 | 0 | 53 | 59 |
| Mississippi | 9 | 3 | 0 | 6 | 65,841 | 191 | 187 | 0 | 0 | 0 | 4 | 4 | 9 | 0 | 3 | 91 | 103 |
| Southeastern States | 6 | 0 | 0 | 6 | 19,402 | 76 | 35 | 0 | 0 | 0 | 6 | 6 | 1 | 0 | 0 | 60 | 61 |
| Montana | 14 | 3 | 3 | 8 | 56,432 | 203 | 130 | 1 | 0 | 0 | 5 | 6 | 5 | 0 | 0 | 52 | 57 |
| Wyoming | 18 | 10 | 0 | 8 | 105,703 | 337 | 347 | 1 | 0 | 0 | 7 | 8 | 11 | 0 | 0 | 62 | 73 |
| Colorado | 19 | 8 | 0 | 11 | 103,672 | 302 | 218 | 1 | 0 | 0 | 9 | 10 | 15 | 0 | 8 | 143 | 166 |
| Utah | 2 | 0 | 0 | 2 | 6,890 | 40 | 36 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 1 | 24 | 27 |
| New Mexico | 46 | 21 | 20 | 5 | 255,324 | 704 | 555 | 1 | 0 | 0 | 3 | 4 | 9 | 0 | 7 | 65 | 81 |
| California | 52 | 41 | 0 | 11 | 201,917 | 1,340 | 1,321 | 3 | 0 | 0 | 8 | 11 | 33 | 0 | 4 | 299 | 336 |
| North Dakota | 1 | 1 | 0 | 0 | 3,074 | 131 | 29 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 24 | 29 |
| Miscellaneous | 0 | 0 | 0 | 0 | 0 | 29 | 41 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 23 | 25 |
| Total United States | 1,017 | 566 | 68 | 383 | 3,928,174 | 25,040 | 24,557 | 37 | 3 | 4 | 193 | 237 | 766 | 58 | 198 | 4,692 | 5,714 |
| Total previous week | 1,003 | 531 | 85 | 387 | 3,949,491 | | | 39 | 3 | 10 | 181 | 233 | 729 | 55 | 194 | 4,499 | 5,477 |
| Total July 12, 1952 | 941 | 461 | 72 | 408 | 3,810,894 | | | 25 | 0 | 5 | 199 | 229 | 735 | 50 | 132 | 4,338 | 5,255 |

Service wells included: *8, †12, ‡1, §2.



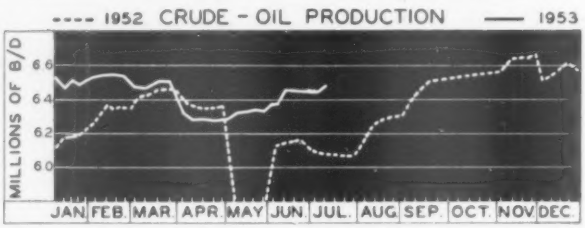



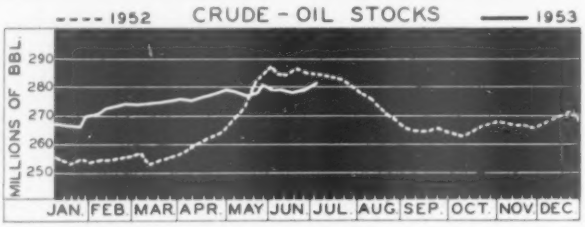




## DAILY AVERAGE PRODUCTION FOR WEEK

| | July 11 Crude oil | July 11 Lease condensate | July 11 Total | July 4 total |
|---|---|---|---|---|
| Alabama | 4,800 | | 4,800 | 4,900 |
| Arkansas | 77,800 | 600 | 78,400 | 78,200 |
| California | 1,015,100 | | 1,015,100 | 1,015,800 |
| Colorado | 104,300 | | 104,300 | 107,800 |
| Eastern | 59,200 | | 59,200 | 59,100 |
| Florida | 1,550 | | 1,550 | 1,550 |
| Illinois | 156,400 | | 156,400 | 164,500 |
| Indiana | 35,400 | | 35,400 | 35,500 |
| Kansas | 302,000 | | 302,000 | 298,100 |
| Kentucky | 30,400 | | 30,400 | 30,200 |
| Louisiana | 674,550 | 40,450 | 715,000 | 680,425 |
| North | 108,900 | 2,450 | 111,350 | 111,700 |
| South | 565,650 | 38,000 | 603,650 | 568,725 |
| Michigan | 33,800 | | 33,800 | 34,100 |
| Mississippi | 93,950 | 4,100 | 98,050 | 97,300 |
| Montana | 30,200 | | 30,200 | 30,400 |
| Nebraska | 13,200 | | 13,200 | 13,400 |
| New Mexico | 197,100 | 850 | 197,950 | 197,025 |
| Oklahoma | 539,600 | | 539,600 | 537,800 |
| Texas | 2,805,625 | 44,800 | 2,850,425 | 2,831,225 |
| Dist. 1 | 38,150 | 300 | 38,450 | 37,650 |
| Dist. 2 | 155,350 | 6,000 | 161,350 | 160,700 |
| Dist. 3 | 453,400 | 22,200 | 475,600 | 472,950 |
| Dist. 4 | 266,000 | 6,000 | 272,000 | 268,975 |
| Dist. 5 | 49,650 | 350 | 50,000 | 49,625 |
| Dist. 6 | 126,200 | 5,050 | 131,250 | 129,225 |
| East Texas field | 247,500 | | 247,500 | 249,850 |
| Dist. 7-B | 117,800 | 50 | 117,850 | 117,025 |
| Dist. 7-C | 162,050 | 4,000 | 166,050 | 166,050 |
| Dist. 8 | 928,525 | 400 | 928,925 | 921,325 |
| Dist. 9 | 184,500 | 400 | 184,900 | 181,900 |
| Dist. 10 | 76,500 | 50 | 76,550 | 75,950 |
| Utah | 5,000 | | 5,000 | 5,300 |
| Wyoming | 208,900 | | 208,900 | 210,000 |
| North Dakota | 14,600 | | 14,600 | 14,600 |
| Total U. S. | 6,403,475 | 90,800 | 6,494,275 | 6,447,225 |
| Change previous week | | | up 47,050 | |
| Canada | 201,450 | | 201,450 | 222,400 |
| Total U. S. production, January 1-July 11 | | | 1,234,467,925 bbl. | |
| Same period last year (crude plus cond.) | | | *1,179,525,950 bbl. | |

*Includes 17,089,835 bbl. condensate.



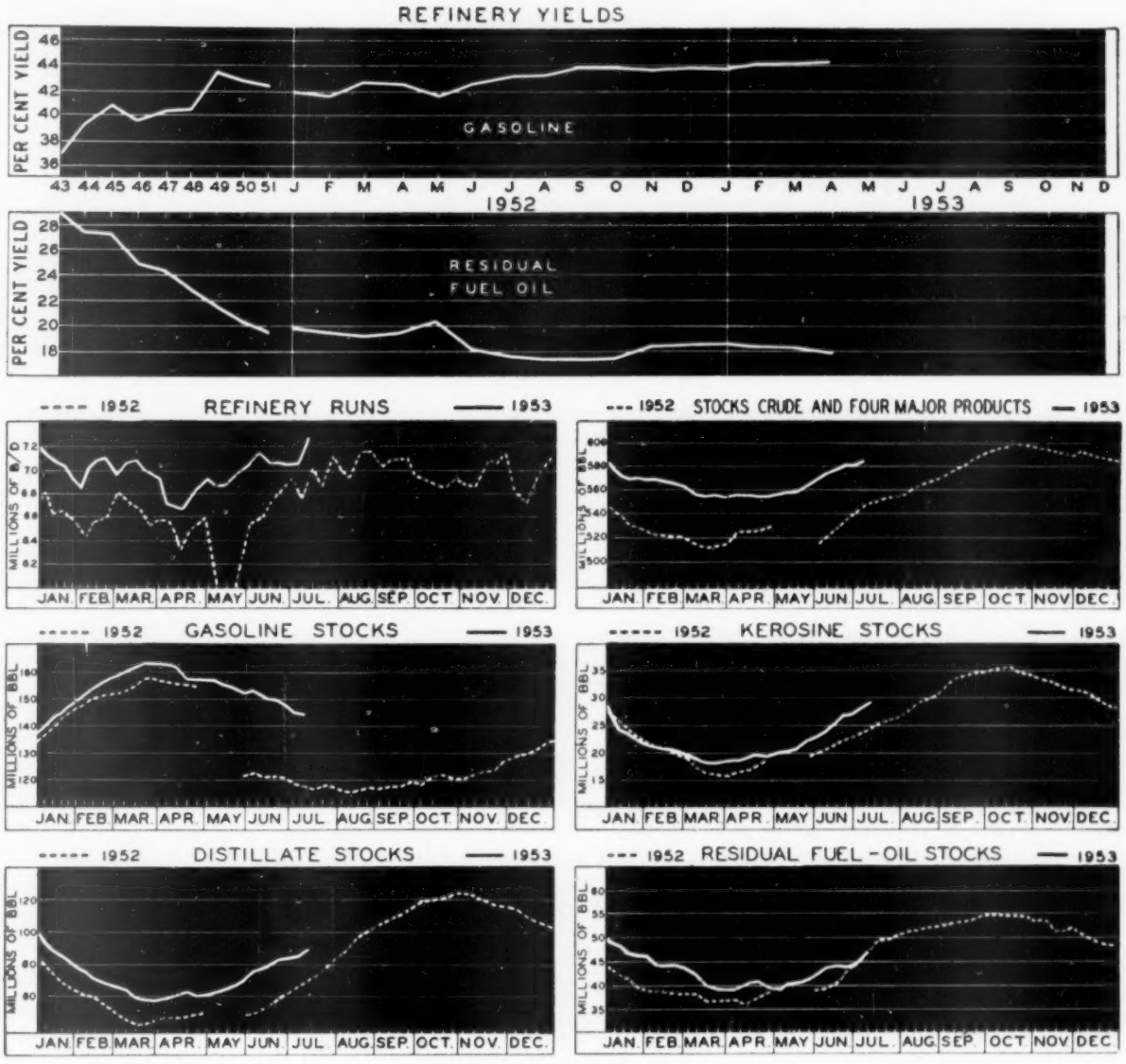




## CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

| | July 4, '53 | June 27, '53 | July 5, '52 |
|---|---|---|---|
| Pennsylvania Grade | 2,653 | 2,705 | 2,228 |
| Other Appalachian | 2,210 | 2,226 | 2,134 |
| Illinois, Indiana, Michigan | 11,946 | 11,924 | 12,815 |
| Arkansas | 2,789 | 2,727 | 3,115 |
| Louisiana | 15,988 | 15,385 | 15,325 |
| North | 2,667 | 2,504 | 2,352 |
| Gulf | 13,321 | 12,881 | 12,973 |
| Mississippi | 3,849 | 3,826 | 3,480 |
| New Mexico | 7,450 | 7,246 | 7,542 |
| Oklahoma and Kansas | 39,184 | 39,264 | 43,621 |
| Texas | 134,749 | 133,399 | 140,345 |
| East Texas proper | 11,461 | 11,440 | 13,740 |
| West Texas | 62,151 | 61,890 | 62,020 |
| Texas Gulf | 26,424 | 26,692 | 29,943 |
| Other Texas | 34,713 | 33,377 | 34,642 |
| Rocky Mountain | 17,001 | 16,656 | 15,092 |
| California | 33,671 | 33,127 | 31,298 |
| Foreign | †10,532 | 11,373 | 8,524 |
| Total | 282,022 | 279,858 | 285,519 |

*Bureau of Mines. †Includes 3,039,000 bbl. in California.

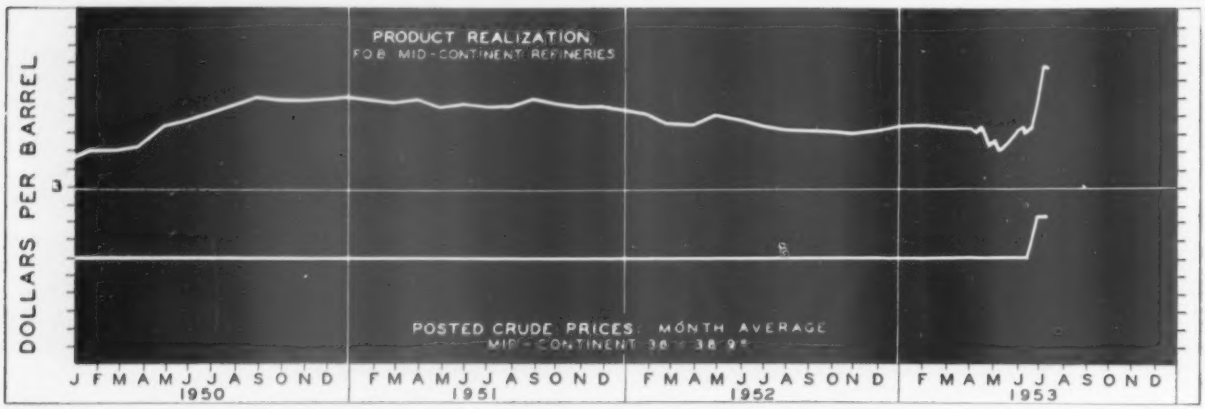

REFINERY YIELDS
PER CENT YIELD
GASOLINE
43 44 45 46 47 48 49 50 51 J F M A M J J A S O N D J F M A M J J A S O N D
1952
1953
PER CENT YIELD
RESIDUAL FUEL OIL
---- 1952 REFINERY RUNS —— 1953
MILLIONS OF B/D
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
--- 1952 STOCKS CRUDE AND FOUR MAJOR PRODUCTS — 1953
MILLIONS OF BBL
----- 1952 GASOLINE STOCKS —— 1953
MILLIONS OF BBL
----- 1952 KEROSINE STOCKS —— 1953
MILLIONS OF BBL
----- 1952 DISTILLATE STOCKS —— 1953
MILLIONS OF BBL
--- 1952 RESIDUAL FUEL-OIL STOCKS — 1953
MILLIONS OF BBL

## A.P.I. REFINERY REPORT, JULY 11

(Thousands of barrels)

| District— | Daily avg. runs | Daily average production Gaso.* | Kero. | Dist. | Resid. | Stocks‡ Gaso.† | Kero. | Dist. | Resid. | Bureau of Mines, July 1952 Daily avg. runs | Daily average production Gaso.* | Kero. | Dist. | Resid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East Coast | 1,132 | 443.7 | 38.6 | 264.4 | 240.4 | 33,494 | 11,601 | 29,639 | 12,320 | 1,056 | 416.2 | 46.3 | 234.4 | 235.0 |
| Appalachian: | | | | | | | | | | | | | | |
| District 1 | 108 | 47.7 | 4.1 | 19.2 | 14.0 | 3,592 | 541 | 932 | 612 | 105 | 45.5 | 4.9 | 14.9 | 11.4 |
| District 2 | 91 | 48.4 | 5.3 | 12.4 | 14.0 | 1,477 | 389 | 536 | 176 | 81 | 42.0 | 2.8 | 14.3 | 10.7 |
| Ind., Ill., Ky. | 1,305 | 716.6 | 72.3 | 195.3 | 172.9 | 28,348 | 6,150 | 14,584 | 3,989 | 1,300 | 691.4 | 72.1 | 238.9 | 150.5 |
| Okla., Kans., Mo. | 627 | 371.3 | 15.0 | 156.9 | 57.9 | 14,839 | 1,923 | 10,114 | 1,271 | 610 | 343.9 | 15.2 | 142.8 | 58.3 |
| Inland Texas | 289 | 187.7 | 12.7 | 53.0 | 40.1 | 5,990 | 535 | 1,620 | 1,449 | 273 | 188.0 | 13.1 | 44.6 | 40.9 |
| Texas Gulf Coast | 1,681 | 832.6 | 126.7 | 385.4 | 233.7 | 19,595 | 3,738 | 13,062 | 6,903 | 1,648 | 743.9 | 138.7 | 412.8 | 265.0 |
| La. Gulf Coast | 595 | 303.3 | 76.9 | 127.3 | 53.1 | 7,377 | 2,770 | 5,750 | 1,385 | 531 | 232.8 | 48.4 | 148.1 | 51.7 |
| N. La. and Ark. | 78 | 30.3 | 6.6 | 25.0 | 7.1 | 3,099 | 555 | 660 | 106 | 77 | 31.9 | 5.8 | 18.6 | 6.1 |
| Rocky Mountain: | | | | | | | | | | | | | | |
| New Mexico | 20 | 12.4 | | 3.1 | 3.9 | 196 | | 39 | 32 | 20 | 12.4 | 0.4 | 2.9 | 4.1 |
| Other Rocky Mtn. | 237 | 119.4 | 2.4 | 56.4 | 39.0 | 5,992 | 259 | 2,067 | 1,003 | 241 | 112.4 | 3.5 | 46.4 | 41.8 |
| California | 1,104 | 458.3 | 3.3 | 164.0 | 404.6 | 20,054 | 408 | 11,250 | 17,908 | 985 | 434.2 | 6.3 | 156.6 | 361.2 |
| July 11, 1953 | 7,267 | 3,571.7 | 363.9 | 1,462.4 | 1,280.7 | 144,053 | 28,869 | 90,253 | 47,154 | 6,927 | 3,294.6 | 357.5 | 1,475.3 | 1,236.7 |
| July 4, 1953 | 7,053 | 3,434.9 | 333.9 | 1,493.9 | 1,265.7 | 144,497 | 27,874 | 86,274 | 44,738 | | | | | |
| July 12, 1952 | 7,013 | 3,321.6 | 345.3 | 1,449.7 | 1,277.6 | 118,332 | 24,306 | 72,515 | 48,395 | | | | | |

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38° & 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

**In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.68 for week ended July 4, $3.70 for previous week, and $3.36 for July 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.**

## REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of July 15, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

### GASOLINE, KEROSINE, AND FUEL OILS

| | Mid-Continent Group 3 | New York Harbor (barge) | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline | 11⅜-11⅝ | 13.5-13.8 | 11.5-11.75 |
| Premium gasoline | 12⅜-12⅞ | 14.5-14.8 | 12.5-12.75 |
| 42-44 w.w. kerosine | 8.875-9.25 | 10.15-10.4 | 9.5 |
| No. 2 straw fuel oil | 8-8.25 | 9.15-9.4 | 8.5 |
| No. 6 residual | $1.10-1.20 | $2.25-2.40 | $1.75-1.90 |

### NATURAL GASOLINE

| | Group 3 | North Texas | N. La. |
|---|---|---|---|
| Grade 26-70 | 5½ | 5 | 5¼ |
| Grade 18-55 | 6.60 | 6.10 | 6.35 |

### LUBRICATING OILS

**South Texas**

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 12-13.5 |
| 750 vis., No. 3-4 neutral | 15-16.5 |
| 2,000 No. 5-6 neutral | 17-18.5 |

### LUBRICATING OILS

**Mid-Continent**

| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 19.5-20.5 |
| 200 vis., No. 3 neutral, 0-10 pp. | 13 |

**Western Pennsylvania**

| | |
|---|---|
| 145-155 vis., 10 p.t. bright stock | 25.5 |
| 180 vis., 10 p.t. neutral | 27.5 |

### WAX

**Mid-Continent**

| | |
|---|---|
| 132-134 A.M.P. | 6.0 |

HOME-HEATING fuel markets are still unsettled in most areas, having failed to reach a firm basis since the price increase that followed the rise in crude prices at the middle of June. The advance in crude prices came at a time when kerosine and distillate markets were slightly soft because of stocks left over at the end of a warmer-than-normal heating season. Many marketers estimated that most of the increased cost of crude would have to be met by higher gasoline prices with some slight help from residual fuels.

In the New York Harbor area, most suppliers are posting 9.9 cents a gallon for No. 2 fuel with a summer discount of 0.5 cent bringing the net to 9.4 cents. This represents a reduction of 0.35 cent from the first price set after the new crude posting. Material is reported to be available in the area at 9.15 cents, the price before the crude increase. Some marketers believe that continued sales at the old price will eventually bring general postings down to a net of 9.15 cents and wipe out all of the increase. The market uncertainty is keeping trading at a standstill.

The spot tanker market continues at the same low levels. Dirty tankers on the Gulf-East Coast run are quoted at 45 per cent off the old Maritime Commission base, and clean products are MC minus 25 per cent. With market conditions tending to push No. 2 on the New York Harbor down to 9.15 cents a gallon, tanker costs of almost 0.7 cent a gallon is tending to put pressure on the quoted price of 8.5 cents at the Gulf Coast. Without some firming of the distillate market on the East Coast, Gulf Coast prices may go lower.

Lower prices for distillates on the Gulf Coast will tend to shift more of the area surplus to barge movement up the Mississippi. Group 3 prices, in turn, are influenced by changes in barge movement from the Gulf Coast to the North Central area.

## CRUDE PRICES GRAVITY SCHEDULE

| | Signal Hill, Calif.* | Okla-homa, Kansas | Gulf Coast Tex.† | West Tex.‡ |
|---|---|---|---|---|
| 14-14.9 | $1.87 | | | |
| 15-15.9 | 1.93 | | | |
| 16-16.9 | 1.99 | | | |
| 17-17.9 | 2.05 | | | |
| 18-18.9 | 2.11 | | | |
| 19-19.9 | 2.18 | | | |
| 20-20.9 | 2.24 | $2.50 | | $2.37 |
| 21-21.9 | 2.30 | 2.52 | | 2.39 |
| 22-22.9 | 2.37 | 2.54 | | 2.41 |
| 23-23.9 | 2.45 | 2.56 | | 2.43 |
| 24-24.9 | 2.53 | 2.58 | $2.91 | 2.45 |
| 25-25.9 | 2.61 | 2.60 | 2.93 | 2.47 |
| 26-26.9 | 2.69 | 2.62 | 2.95 | 2.49 |
| 27-27.9 | 2.76 | 2.64 | 2.97 | 2.51 |
| 28-28.9 | 2.83 | 2.66 | 2.99 | 2.53 |
| 29-29.9 | 2.91 | 2.68 | 3.01 | 2.55 |
| 30-30.9 | 2.97 | 2.70 | 3.03 | 2.57 |
| 31-31.9 | 3.04 | 2.72 | 3.05 | 2.59 |
| 32-32.9 | 3.12 | 2.74 | 3.07 | 2.61 |
| 33-33.9 | | 2.76 | 3.09 | 2.63 |
| 34-34.9 | | 2.78 | 3.11 | 2.65 |
| 35-35.9 | | 2.80 | 3.13 | 2.67 |
| 36-36.9 | | 2.82 | 3.15 | 2.69 |
| 37-37.9 | | 2.84 | 3.17 | 2.71 |
| 38-38.9 | | 2.86 | 3.19 | 2.73 |
| 39-39.9 | | 2.88 | 3.21 | 2.75 |
| 40 and above | | 2.90 | 3.23 | 2.77 |

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953.

## FLAT CRUDE PRICES

Representative posted schedules per barrel.

| | |
|---|---|
| Louisiana: | |
| Cotton Valley (distillate) | $3.00 |
| Cotton Valley (Holloway crude) | 2.95 |
| Texas: | |
| East Texas | 2.90 |
| Chapel Hill | 2.83 |
| Conroe | 3.13 |
| Van | 2.73 |
| Pennsylvania Grade: | |
| Bradford | 4.40 |
| Southwest Pennsylvania | 3.97 |
| West Virginia | 3.91 |
| Illinois Basin | 3.02 |

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FOR SALE: 10,000′—4½" drill pipe, with tool joints cut off, located at Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

## FOR SALE

**SUPERIOR HEAVY DUTY DIESEL**

510 hp. at 360 r.p.m.—5 cylinder—14½x18 type ZDSB — non-reversing — vertical—4 cycle—cold starting—mechanical injection. Engine is totally enclosed. Complete with a 48" 7 groove V-belt sheave and new spare parts. For heavy duty pumping, dredge service, power generation, textile and saw mills, mining, etc. EXCELLENT CONDITION, IMMEDIATE DELIVERY.

**G. M. 3-71 DIESEL GEN. SET**

30 kw. 2 cylinder 4½x5 diesel—radiator cooled—electric starting. Delco 3/60/440 generator — with switchgear. Skid mounted. Portable.

**30 KW SHEPPARD DIESEL SETS**

30 kw. Sheppard—115 volts DC—radiator cooled . Built 1950. Excellent condition. Self-mounted radiator and fuel tank. 16 units available.

**75 KW WAUKESHA DIESEL GENERATOR SET**

75 kw.—230 volts DC—totally enclosed, self-contained. Waukesha 6 cyl., 160 hp., 1200 r.p.m. diesel driving 75 kw. 1200 r.p.m. G. M. marine type generator. Self-contained switchboard and radiator.

**100 KW G. M. 3-268A A.C. DIESEL GENERATOR SETS**

440 volts—3 phase—60 cycle. 20 kw. D.C. generator on same shaft—5 kw. exciter—120 volts D.C.—electric starting.

**LORIMER SLOW SPEED 100 KW A.C. DIESEL GENERATOR SET**

Slow speed heavy duty unit. 150 hp.—5 cyl.—4 cycle—720 r.p.m.—electric starting—Ross heat exchanger—engine operating panel. Allis-Chalmers generator—100 kw.—440/3/60—80% PF—cubicle deadfront switchgear. Can quote with radiator if desired.

**300 KW G. M. D.C. DIESEL SET**

ENGINE: G.M. 8-268A—6½x7—1200 r.p.m.—air starting. GENERATOR: 300 kw. G.E.—120/240 volts D.C.—3 wire—totally enclosed—Marine type BB—with switchgear.

**ELECTRIC WINCHES**

Single drum—50 hp. 230 volt D.C. motors—built-in controls.

**STEAM TURBO-GENERATOR SETS**

300 kw—120/240 volts D.C.—1200 r.p.m.—1250 amps.—turbine W.P., 225 lbs. to 440 lbs.

**MARINE SURFACE CONDENSERS**

1050 sq. ft.—3000 sq. ft.

**THE BOSTON METALS CO.**
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BALTIMORE 2, MARYLAND
CURTIS 7-5050

## EQUIPMENT FOR SALE

FOR SALE: 1951 Cessna 195: 245 HP; 400 total hours; Cross-wind Gear; VHF; OMNI; Gyros; Hangared; Brand new condition; one owner; $12,500.00; write Box G-582, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 60,000 4½ o.d. s.s. line, 60,000 3½ o.d. line all new. 5—55,000 bbl. tanks. 5—10,000 and 5—5,000 tanks. Lundquist Pipe & Supply Co. Phone 5-8850, Tulsa, Okla. P. O. Box 1215.

16,000′ of 8⅝" OD, 28# & 32# 7,500′ of 10¾" OD, 32.75# 7" OD 20#, 23# & N80. All above casing new. 15,000′ of 3½" Mod. Drill Pipe. Chapman Pipe & Supply, Box 4232, Ph. ME-81567. Okla. City, Okla.

## USED LINE PIPE FOR SALE

17 miles 10¾" OD Electric Weld 28.04# PE BFW. Approx. length 37′. 51 miles 8⅝" OD Seamless 23.57# PE BFW. Approx. length 35′. 10 miles 6⅝" OD Seamless 17.02# PE BFW. Approx. length 35′. We consider the above first-class merchandise.

**BETHLEHEM SUPPLY CO.**
Box 2171, Tulsa, Oklahoma
PHONE 5-9261, Ext. 361

## EQUIPMENT FOR SALE

FOR SALE: Sullivan "300-A" Trailer mounted drilling rig. Powered with 2 Buda engines, double derrick, 7¼x10 pump, swivel, kelly, light plant. Complete rig less drill pipe. Excellent condition. For inventory and price write Box 1022, Del Rio, Texas, or Phone 813.

| | | |
|---|---|---|
| 2100′ | 10¾" OD 31.20# | A-53 New Smls Pipe PE SRL |
| 600′ | 8⅝" OD 24.70# | Ditto |
| 500′ | 5⅝" OD 14.62# | Ditto |
| 900′ | 10¾ OD 40.48# | A-53 New LW Pipe PE SRL |

Pipe is National and Spang located at Wichita.

**FRANK MORRIS AND COMPANY**
424 South Cheyenne St., Tulsa, Oklahoma
Telephone 2-6247

## FOR SALE DIESELS AND PUMPS

Two new 1947 unused 475 BHP 8 cylinder Baldwin Model VG Diesel Engines, each connected to Worthington Horizontal Triplex Double Acting Pump, both units with Falk Couplings and other accessories. Location Ohio, immediate delivery. Direct inquiries to

**THE BUCKEYE PIPE LINE CO.**
Joseph Steele, Purchasing Agent
Room 2280, 30 Broad St.
New York 4, N. Y.

## FOR SALE

## PIPE-LINE PUMPING EQUIPMENT

### 7 Complete Diesel Stations:

25,000 to 50,000 barrels per day; reciprocating power pumps and diesel oil engines ranging from 500 to 800 h.p. in both vertical and horizontal type; and all auxiliary equipment in connection therewith.

### 6 Complete Steam Stations:

40,000 to 50,000 barrels per day with 250 h.p. Babcock & Wilcox water tube brick furnace boilers with steam pumps and triple pumping engines.

All above equipment recently taken out of service from Sinclair Pipe Line Co's. former main crude trunk lines from Humbolt, Kansas, to Wilmington, Illinois. All equipment was in first-class operating condition when system recently discontinued. Detailed specifications and prices available on request:

Write - Call - Wire

**HUMBOLDT-CHICAGO PIPE LINE PROJECT**
216 W. 2nd St. Tulsa, Okla. Phone: 3-5400

## EQUIPMENT FOR SALE

**FOR SALE**

Rambler H-40, IDECO with substructure. Trailer mounted. C 350 Ideal and 7½ x 14 BA Emsco Pumps. Drill Pipe, Rotary Table, Block, Hook, Swivel, Kelly and Light Plant. Cardwell Trailer-Rig. 7¾ x 18 Wheeland and C 12 Emsco Pumps. Drill Pipe, Rotary Table, Block, Hook, Swivel, Kelly and Light Plant. Model R L CARDWELL Spudder, skid mounted with D 13000 Caterpillar Motor. Wilson-Mogul double drum Draw Works with substructure, Mast, GKU Waukesha motor. FRANKS single drum Draw Works with Mast mounted on International L 190 Tandem Truck. Two Drilling in Units consisting of Guiberson Head with Waukesha motor, skid mounted. D. Jack Simmons, P.O. Box 213, Farmington, N. M. Phone 322R.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

JOY 300 Drilling Rig butane powered, mounted on Brockaway 6x6 truck, 3500 feet 3½ inch drill pipe. Auxiliary mud pump and butane engine as separate unit. All tools and equipment included. This rig in first-class working condition and ready to go to work immediately. Call or write Steele Brothers, Crete, Nebraska. Phone 127.

**Gaso Duplex 4½" x 8" Power Pump with Chrysler C-36 Engines, skid mounted. Immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units**

**H. H. COFFIELD**
**Attn.: W. H. ORR**
**Phones: 132—Rockdale, Texas**
**AT-3427—Houston, Texas**

# FOR SALE

New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.

**H BEAMS PILE SECTIONS**

Phone or Wire your steel requirements.

We are also interested in purchasing your surplus material. We assure you our prices will be the best obtainable.

**CARSAND STEEL CORP.**
**14-23 34th Avenue**
**Astoria, New York**
**Astoria 8-4484 8-8023**

## EQUIPMENT FOR SALE

FOR SALE: 7500′ 4½" 16.60# Sonoscoped Drill Pipe 4500′ 3½" 13.30# Reg. Drill Pipe. 1—6" x 41′ Square Kelly, Rotary, Cable Tool and production equipment. Giffin & Thompson Supply, Hoisington, Kansas. Phone 477.

FOR SALE: 5—Shriver 42"x42" cast iron Filter Presses, Plate & Frame Type, 27, and 54 chambers 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; #12 Sweetland Filter for 72 monel covered leaves on 2" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38. N. Y. BArclay 7-0600.

FOR SALE: 2— Drilling rigs, 5,000′ capacity. Franks S.A.L. 5000, with 96′ Franks derrick, 3½" drill pipe, now drilling in West Texas. Franks double drum draw works, Lee C. Moore derrick, 4½" drill pipe, drilling in South Texas. Both rigs complete with all equipment. For inventory and price write Box 1022, Del Rio, Texas, or Phone 813.

FOR SALE: U-15 perfect condition. Wonderful buy available only because of health. Cummins L1-600 Engines, Gardner-Denver 16" Pump, 7000′ nearly new 4½" Drill Pipe, 16 Drill Collars, 10′ Sub-Structure, Steel Floor, Dog House, Change House, Necessary Tools, including Trailer House. If interested in good Rig ready to go, Investigate. Box G-573, The Oil and Gas Journal, Tulsa, Oklahoma.

COOPER Model U6 Well Servicing Skid Winch with 8⅝" OD x 7" OD Cardwell Cross Sheave Mast mounted on 1939 4 to 5 Ton DR60 International Truck. Price $1850.00. Leo Kent, Kent Well Servicing, El Dorado, Kansas. Phone 1068.

**PUMPS**
**Perfect Condition**

Aldridge Quintuplex 5½x10
Aldridge Quintuplex 5¾x8

Quotations on Request

**TANCRED STEEL CONSTRUCTION CO.**
**P.O. Box 5895 Tel: Federal 6576**
**Dallas, Texas**

***Cuts Drilling Cost!***
**ARMITE DRILL COLLAR**
**& TOOL JOINT COMPOUND**
ARMITE LABS., 6609 Broad St., Los Angeles 1, Calif
J. B. Carver Jr., 1103 E. Maple, Midland, Tex.

## EQUIPMENT FOR SALE

FOR SALE: 1 Wilson Atlas Draw Works, Serial #6245. 2 G.A.K. Waukesha engines, completely overhauled with all new parts. A-1 conditnon. Makin Drilling Company, Box No. 1628, Phone 3-3141, Hobbs, New Mexico.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

36L BUCYRUS-ERIE Spudder used OS with practically new L525 Buda Engine. Located Shidler, Oklahoma. Contact Wayne King at Shidler or Buckeye Supply Co., El Dorado, Kansas.

NEW LINE PIPE: 15,000 Feet—2" P.E. Buttweld (Black). Box 3235—Tel. 6-2866—Tulsa, Oklahoma.

**WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.**

## EQUIPMENT WANTED

--WANTED: Three used 12 cylinder RXIVW LeRoi engines, in good condition, at a bargain. Makin Drilling Company, P.O. Box 1628, Hobbs, New Mexico. Phone 3-3141.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy, We sell equipment everywhere. If you want to sell or buy contact Pressey & Son, Pueblo, Colorado

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and in "Equipment For Sale" classified advertisement in the Journal will find a buyer See box heading for classified rates or write The Oil and Gas Journal.
The Oil and Gas Journal.

**WANTED**

150 GPM LP Gas Dehydration Unit
300# WP Vessels 4′ x 10′ to 6′ x 15′.

**ANCHOR PETROLEUM COMPANY**
**Atlas Life Bldg., Tulsa, Oklahoma**

## HELP WANTED

FOREMAN WANTED
Man with refinery construction and maintenance experience for permanent location with independent refiner. Write, giving complete record and salary desired. Box G-596, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal

# FOR SALE

## 1094 MILES 8-⅝" O.D. 28.55#
## 14 MILES 10-¾" O.D. 40.48#
## 484 MILES 12-¾" O.D. 49.56#

**All above pipe is lapweld in approximate 20′ random lengths, will be machine cleaned, straightened, and beveled for welding. This pipe is being reclaimed from multiple pipe lines extending from Humbolt, Kansas, to Chicago, Illinois. Pipe now in process being taken up and reconditioned and will be made available for prompt shipment.**

**Pipe will be offered for outright sale at attractive savings or will consider placing pipe in oil, gas, or water systems.**

For Further Information: Write - Call - Wire

## HUMBOLDT-CHICAGO PIPE LINE PROJECT

216 W. 2nd St., Tulsa, Okla. Phone 3-5400

# ESTIMATORS

Young engineers capable of mechanical estimating for construction of refineries, steam power and similar industrial projects. Must have some field experience. Considerable weight given to ambition, intelligence and interest in estimating and cost analysis.

**BECHTEL CORPORATION**
**220 Bush Street**
**San Francisco, California**

## HELP WANTED

WANTED: Petroleum or Mechanical Engineers for oil tool design. Field experience desirable. State age, education, experience and salary expected. Box G-556, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 434 Frick Bldg., Pittsburgh 19, Pa.

LAND man experienced in securing easements, paying damages and handling other allied problems with minimum supervision. Permanent position. Box 3, Lake Zurich, Illinois.

**PLANT MANAGER**

Company building plant in Chicago area wants plant manager with refinery engineering, construction and operating background. Experience in asphalt production and handling essential. Write giving complete record. Box G-589, The Oil and Gas Journal, Tulsa, Oklahoma.

# PETROLEUM ENGINEERS

**FOREIGN SERVICE**

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising, testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-5
Arabian-American
Oil Company
**505 Park Avenue**
**New York 22, N. Y.**

# LARGE INDEPENDENT OIL CORPORATION

...has openings for three junior engineers who are interested in refining operations. Location of employment will be in large central Oklahoma refinery in a new technical service that is being developed.

These positions involve technical service work in crude distillation; catalytic cracking; gas recovery; polymerization; H-F Alkylation; and delayed coking.

Applicants must be refining, mechanical, or chemical engineering graduates. These are permanent positions with a young, progressive company and offer excellent opportunity for experience and for advancement in an expanding organization. Give details of experience and salary expected.

**Box G-567, The Oil and Gas Journal,**
**Tulsa, Oklahoma**

## HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

**OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.**

SALES ENGINEER—to represent manufacturer plastic pipe, Mid-Continent, Gulf Coast, West Texas. Box G-585, The Oil and Gas Journal, Tulsa, Oklahoma.

SOUTH AMERICA. These jobs are with one of the better oil companies. Our fee paid. Mechanical Engineer—graduate, no experience required. Petroleum Engineer—graduate, no experience required. Chemical Engineer—graduate, no experience required. Mud Technician—two or more years' experience, single. Accountant—college graduate, Accounting major, single. All information confidential and should be mailed to CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5168.

GRADUATE Chemical Engineers and Chemists with or without experience for positions in Research and Development department, located in Tulsa. State qualifications and salary expected. Write Personnel Department, P. O. Box 381, Tulsa 2, Oklahoma.

MAINTENANCE SUPERINTENDENT by aggressive, independent refinery just completing a Catalytic Cracking Unit, to take charge of maintenance and construction. Must be able to supervise the purchasing of materials and equipment and inspect work performed under contract. B.S. degree in Engineering preferred. Require five years experience in refinery operations, including maintenance and construction. When writing give complete details. Apply in full confidence to Personnel Manager, Northwestern Refining Co., St. Paul Park, Minnesota.

TOPPING UNIT SUPERINTENDENT—for young, fast-growing, independent refinery, which has just completed a Catalytic Cracking Unit. B.S. degree in Engineering required. Five years refinery experience, including topping, catalytic cracking, treating, and knowledge of laboratory control. When writing give complete details. Apply in full confidence to Personnel Manager, Northwestern Refining Co., St. Paul Park, Minnesota.

DESIGN ENGINEER: Mechanical Design Engineer with 5 to 8 years experience in design of drilling equipment—specifically draw works, rotary tables, and masts. Progressive expanding company, excellent working conditions and benefits. Salary commensurate with experience. REYNOLDS METALS COMPANY, 2000 S. Ninth Street, Louisville, Kentucky.

**PROCESS ENGINEER**

Engineering contractor has attractive opening for Senior Processing Engineer experienced in design of all types of refinery equipment with special emphasis on catalytic cracking, reforming and polymerization. Require a man with experience and ingenuity to supervise process activities in young and aggressive concern located in Southern California. Please state age, experience, education and salary expected.

**Box G-571**
**The Oil and Gas Journal, Tulsa, Okla.**

**CHEMICAL ENGINEER**
**or**
**CHEMIST**

Major Oil Company operating in Venezuela has opening in Production laboratory for Chemical Engineer or Chemist with experience in operation of Podbielniak Column; preferably low temperature Hyd-Robot type. . . .

Experience in operation P.V.T. equipment desirable but not essential.

**P. O. BOX 35**
**Bowling Green Station**
**New York 4, N. Y.**

## SITUATIONS WANTED

PETROLEUM AND GEOLOGICAL ENGINEER: 34, 8 years varied experience Mid-Continent, Rocky Mt., and Calif., with major and independent companies. Desires position with independent oil producing company, Rocky Mt. or Mid-Continent preferred. Opportunities for advancement and responsibility more immediate than salary. Box G-590, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER: Age 24, married. B.S. in E.E. 30 hours on M.S. I.E. One year experience. Prefer Mid-Continent or Southwest. Box G-559, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 7 years experience in all phases petroleum exploration and exploitation, age 34, excellent physical condition. Desires foreign employment on either salary or retainer basis. Prefer South America or Canada. Box G-563, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Thoroughly experienced and trained all phases field operations and office procedures major company land department. Presently assigned to field. College and legal background. Licensed attorney. Location optional. Extensive travel satisfactory. Box G-569, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY SUPERVISOR AVAILABLE. Chemical Engineer, 12 years diversified experience modern refinery processing and operations supervision desires responsible supervisory position in refining or petrochemical field. Experience includes process planning attendant plant expansion, training personnel and operation supervision bring new units up, plant balance and economic studies, and responsible supervision complete refinery activities. Box G-577, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE: Division Superintendent in charge of drilling and production for large operator in West Texas. Twenty years diversified experience in field operations and management. Available September 1st. Box G-558, The Oil and Gas Journal, Tulsa, Oklahoma.

**ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.**

LANDMAN with three and one-half years experience with major company in West Texas desires position on Texas-Louisiana Gulf Coast. Familiar with lease purchasing, title curing, farmouts, office work, etc. Box G-550, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATIVE position with oil field equipment or specialties company, prefer Oklahoma. Engineering degree, 3 years sales engineering field experience. Age 30, married. Box G-587, The Oil and Gas Journal, Tulsa, Oklahoma.

PILOT, 31, married. 6000 diversified hours, ATR, desires to affiliate with individual or company requiring services of capable, experienced pilot. Prefer Southwest. Box G-586, The Oil and Gas Journal, Tulsa, Oklahoma.

DRAFTSMAN welded steel plate, casting, piping, map, 55, unemployed, $1.10. Akos Ludasy, Room Twelve, 17½ East First, Palace Hotel, Tulsa.

PETROLEUM ENGINEER with seven years experience with major oil Co., nine years experience with major logging Co. on La. and Texas Gulf Coast. Desires change. Would like position with small independent or consultant firm. Box G-591, The Oil and Gas Journal, Tulsa, Oklahoma.

**ENGINEER-ATTORNEY**

Registered Texas engineer admitted to Federal Bar. Age 35, presently employed. Thoroughly versed in all phases natural gas engineering and legal practice before Federal regulatory bodies. 15 years design, construction and operation with four years concurrent experience in regulatory administrative practice as technical consultant. Only interested in position of responsibility with substantial organization. Box G-593, The Oil and Gas Journal, Tulsa, Oklahoma.

### SITUATIONS WANTED

CHEMICAL ENGINEER, age 39. Presently employed as a Chief Project Engineer. Twenty years experience in operation, maintenance and design of Pipe Lines, Gasoline plants, Refineries, and Petro-Chemical plants. Desires responsible position with a progressive Oil Company operating in Canada. Box G-595, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: 34, experienced, law degree, married, free to relocate, desires position with oil or gas company. Box G-592, The Oil and Gas Journal, Tulsa, Oklahoma.

**THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.**

### LEASE AND DRILLING BLOCKS

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver Colorado.

OPERATOR wanted to wildcat Tennessee acreage over Oil-Gas seepages. Valuable gas market adjacent. E. A. Munyan, 102 Fairview Drive, Fairfax, Va.

NEBRASKA—SALINA BASIN: Drilling Blocks, Geology and Shot information. Farm outs or will sell part and drill well. Box G-581, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL SELL for money to drill, or will trade for drilling proposition, interests in acreage in Western Anderson County, Kansas. Block includes several hundred acres. Ralph M. Williams, Wellington, Kansas.

FOR SALE: Two producing oil wells, southwest Kansas area, on a 160 acre lease. Inquire for details, Box 451, Garden City, Kansas.

160 ACRE 9 year Oil and Gas lease by owner, near gas production in Carbon Co., Utah. Bargain, R. O. Barnsley, 950 Lincoln Ave., Palo Alto, Calif.

**LEASES ROYALTIES**

**Producing and Nonproducing**

**Bought and Sold—Any Area**

**Inquiries Invited**

**B. D. BUCKLEY**

**6635 Delmar Ave., St. Louis 5, Mo.**

**A NEW OIL FIELD—SE NEW MEXICO**
As recommended 1st well drilled on D. S. Test showed for 20 b.p.h. Three other fields of like importance to be drilled. Engineering data furnished investors these important areas gratis.
**W. J. PETERMAN, Geologist**
**1918—1953**
**Portales, New Mexico**

**COURT SALE**

To be sold to highest bidder on August 12, 1953, at 10:00 A.M. at Courthouse, Pawhuska, Oklahoma: 6 producing leases in Osage County containing 960 acres with 15 wells, or 13 net working interest wells to interest being sold, with current net daily average production of approximately 26 barrels. Also 16 non-producing leases containing 2,560 acres including 160 acre lease with 5 producing offset wells. For further information contact E. E. Kirkpatrick, Special Master, Phone 797, Box 748, Pawhuska, Oklahoma.

### LEASE AND DRILLING BLOCKS

ALL TENNESSEE production is shallow. Get it on my structures—as others do. N. M. Sauls, Geologist, Cookeville, Tenn.

FOR SALE: Producing Lease, Rice County, Kansas. One Arbuckle and One Kansas City well. For detailed information, write Box G-594, The Oil and Gas Journal, Tulsa, Oklahoma.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

### ROYALTIES

WE WILL BUY producing or non-producing oil royalties. Standard Security Company, 111 Broadway, New York 6, N. Y.

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla. City, Okla. REgent 6-7027.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

**ROYALTIES WANTED**
**Producing Royalties**
**High Grade Only**
**Send Full Particulars**
**Address**
**C. C. HARMON**
**719 World Bldg., Tulsa, Okla.**
**P.O. Box 2151**

### PUBLICATIONS

OUT-OF-PRINT Government Geological Publications and files of Technical Journals our specialty. Inquiries welcomed. CANNER'S (Dept. Ogj), Boston 19, Mass.

### REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

### PRODUCTION SERVICE

GETTING MORE oil and more pay. Other methods used with our Geochemical. Iroco Laboratory, PO Box 630, Stillwater, Oklahoma.

### ELECTRICAL CONTRACTORS

| Office Phone | Res. Phone |
|---|---|
| 5-5315 | 7-4950 |

**W. L. RATCLIFF COMPANY**
**ELECTRICAL CONTRACTORS**
**Industrial—Commercial—Distribution**

| | |
|---|---|
| W. L. Ratcliff | 506 Caddo St. |
| P. O. Box 373 | Shreveport, La. |

### BUSINESS OPPORTUNITIES

**DOLORES EXPLORATION CO.**
will set up and operate
**URANIUM**
- Exploration Projects
- Surface and Subsurface Geology
- Aerogeological Prospecting
- Drilling Programs, Ore Reserves
- Estimates upon Request
- A.E.C. Experience

**Box 973, Beverly Hills, California**

# Equipment Men

## Knieff Becomes Iverson Dallas City Salesman

P. A. KNIEFF

S. J. Iverson, president, Iverson Supply Co., has announced the association of Pat A. Knieff with the Iverson organization, as city salesman in the Dallas area. Knieff has formerly been connected with Jarecki, Ideco, and Bethlehem Supply Co.

## Bradley Made Warner Lewis Sales Manager

The Warner Lewis Co. has just announced the promotion of Thomas R. Bradley as sales manager. Bradley joined Warner Lewis in January 1952 as sales promotion and advertising manager. Prior to his association with the company he was plant manager of Sunray Gas Co.'s wholesale bottled-gas plant at Washington, Iowa.

The Warner Lewis Co. is engaged in the fabrication and sales of water separators, filters, calibrating tanks, and associated products for the petroleum industry.

## Kirby Named Assistant Division Sales Manager

W. L. KIRBY

Weldon L. Kirby has been promoted to assistant division sales manager of Security Engineering Division's West Texas - New Mexico territory, according to an announcement made by A. M. Birnie, Security's general sales manager.

Kirby joined Security in 1946 as a sales engineer and field representative. In 1947 he was transferred to Vernal, Utah, where he represented Security in its Colorado-Utah division. He later returned to Odessa, Tex., in 1948 as district sales manager, a position he had held until his recent promotion.

## H. K. Porter Co. Acquires Control of Leschen & Sons

H. K. Porter Co., Inc., Pittsburgh, has acquired a controlling interest in A. Leschen & Sons Rope Co., St. Louis, according to T. M. Evans, president.

The Leschen company, established in 1857, is one of the country's oldest producers of wire rope. Operations will continue as Leschen Wire Rope Co., a Division of H. K. Porter Co., Inc., under the direction of D. W. Vernon, vice president and general manager. A. A. Leschen, former president, has expressed a desire to retire from active business.

The Porter company through its various divisions now manufactures products for all segments of industry with Quaker Rubber Corp., Philadelphia, manufacturing industrial rubber products; Connors Steel Division, Birmingham, and Buffalo Steel Division, Tonawanda, N. Y., producing steel and light steel products; Delta-Star Electric Division, Chicago, designing and manufacturing high-voltage electrical equipment; Hinderliter Tool Division, Tulsa, producing oil-drilling equipment; Watson-Stillman Co., manufacturing a complete line of forged-steel fittings and hydraulic presses, and Leschen Wire Rope Co., producing wire rope for every purpose.

## Grove Regulator Opens New Rocky Mountain Office

To provide better representation and service in the Intermountain area Grove Regulator Co., manufacturers of Seal-O-Ring valves, and regulators and controls, has opened a new office in Denver. Carleton Clymer is district manager. Grove maintains manufacturing plants in Oakland, Calif., and Houston.

## WILDCAT COMPLETIONS

(Continued from page 190)

N. U. L.-Calvan-Merrill 7-6 Tofield, LSD 7, 6-51-18w4. Dry. TD 3,422 ft.

New British 4-12 Inter Rock, LSD 4, 12-48-21w4. Dry. TD 5,396 ft.

Old Settlers' 1 Elk Island, LSD 16, 17-55-20w4. Lower Cretaceous oil well. TD 3,378 ft.

Cal Standard 3-29 Homeglen, LSD 3, 29-43-1w5. D3 Devonian oil well. TD 8,983 ft., PBTD 8,031 ft.

**BRITISH COLUMBIA**

J. B. White 1 Blueberry, In unsurveyed territory, Mill 111 Alaska Highway. Capped gas well from Triassic, IP 8,000 M.c.f. per day. TD 4,892 ft.

# ADVERTISERS IN THIS ISSUE

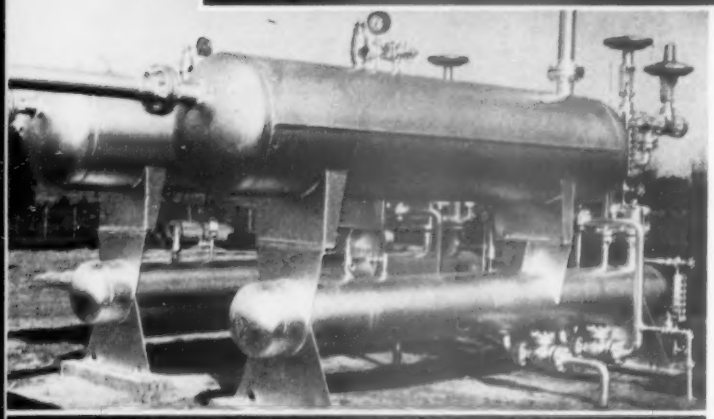

Advance Oil Tool Co. 171
Aerotec Corporation, The 48
Aluminum Co. of America 50
Amercoat Corporation 44
Baird Mfg. Co. 188
Baker Oil Tools, Inc. 119
Beaumont Iron Works, A Subsidiary of American Locomotive Co. 41
Bethlehem Steel Co. 76
Black, Sivalls & Bryson, Inc. 55
Brewster Company, Inc., The 183, 184
Butler Manufacturing Co. 134
Cannon Electric Company 111
Cardinal Chemical, Inc. 86
Caterpillar Tractor Co. 13
Cavins Co. 171
Century Electric Company 30
Chain Belt Co. 34
Charles Machine Works, The 158
Chevrolet Motor Div., General Motors Corp. 28
Classified Advertising 195, 196, 197, 198
Coffing Hoist Company 163
Coppus Engineering Corp. 3
Crane Co. 5
Crose Manufacturing Co., Inc., M. J. 153
Darling Valve and Mfg. Co. 153
Dean Brothers Pumps, Inc. 156
Delta C&S Air Lines 112
Delta Engineering Sales Co. 166
Dowell Incorporated 155
Dresser Manufacturing Division 56
Drilling & Service, Inc. 189
Eastman Oil Well Survey Company 46
Edward Valves, Inc. 16
Elliott Company 47
Empire Trust Company 171
Enardo Manufacturing Co. 128
Ethyl Corporation 19, 20
Evis Manufacturing Co. 121
Fairbanks, Morse & Co. 188
First National Bank & Trust Co. of Tulsa, The 182
First National Bank of Shreveport, The 156
Fluor Corporation, Ltd., The 51
Frontier Chemical Company 159
General Controls 38
General Electric Company 106, 107
Globe Steel Tubes Co. 42
Goodall Rubber Company 150
Goodrich Chemical Company, B. F. (Hycar) 84
Grancell, I. H. 161
Grant Oil Tool Co. 117
Greer Hydraulics Inc. 136
Guiberson Corporation 83
H & M Pipe Beveling Machine Co. 156
Halliburton Oil Well Cementing Co. Inside Front Cover, 22
Harbison-Fischer Mfg. Co. 177
Harper Company, The H. M. 33
Hazard Wire Rope Division of American Chain & Cable Co., Inc. Inside Back Cover
Houston Ready-Cut House Co. 162
Hughes Tool Co. Back Cover
Ideco A Division of Dresser Equipment Co. 7
Inferno Co., The 161, 186
Insley Manufacturing Corporation 181
Iverson Supply Company 164
Jacobson, E. C. 158, 182
Jet-Lube Inc. 186
Johns-Manville Corporation 148
Johnston Testers, Inc. 43
Jones & Laughlin Steel Corp. 8
Jones & Laughlin Steel Corporation Supply Division 27
Kellogg Co., The M. W. 35, 101, 102
Kennametal, Inc. 144
Kobe, Inc., Division of Dresser Equipment Co. 29
Lane-Wells Company 58
Layne & Bowler, Inc. 39
Lehman Brothers 79
Leland Equipment Co. 179
Leschen & Sons Rope Co., A. 144
Levingston Shipbuilding Co. 136
Loeb, Rhoades & Co., Carl M. 120
Lone Star Cement Corporation 62
Macco Corporation 57
Mack Trucks, Inc. 52
Marlow Pumps 111
Martin-Decker Corp. 175
Mason-Neilan Regulator Co. 24, 25
Mayo Hotel, The 182
McCord Corporation 186
Midwest Piping Company, Inc. 9
Mission Mfg. Company 130, 131
Moon Brothers, Ltd. 133
Moore Corporation, Lee C. 138, 139
Morse-Starrett Products Company 180
Murphy Diesel Company 17
Murphy, Frank W. 171
National Airoil Burner Co., The 167
National Bank of Tulsa 6
National Supply Co., The 10
National Tank Company 200
Nicolet Industries, Inc. 159
Nordberg Mfg. Co. 174
Oil and Gas Journal, The 159
Oil Equipment Mfg. Co., Inc. 185
Oil Metering and Processing Equipment Corporation 118
Oil Well Mfg. Corp. 172
Oil Well Supply Co. 4
Otis Pressure Control, Inc. 54
Parkersburg Rig & Reel Co. 32
Peerless Supply Co., Inc. 158
Pelton Water Wheel Co. 36
Penn Controls, Inc. 129
Petroleum Distributing Co. 162
Radio Corporation of America 109
Reda Pump Company 167
Reed Roller Bit Company Front Cover
Republic Rubber Division of Lee Rubber & Tire Corp. 163
Republic Steel Corporation 37
Reynolds Metals Company 142
Rockford Clutch Division of Borg-Warner Company 122
Rockwood Sprinkler Company 11, 31
Roebling's Sons Company, John A. 18
Ross-Martin Co. 186
Royston Laboratories Inc. 146
Rust-Oleum Corporation 21
Second National Bank of Houston 12
Security Underground Storage Co. 149
Sheffield Steel Corporation 45
Smith Oil Tool Co., H. C. 160
Socony-Vacuum Oil Co., Inc. 26
Spang & Co. 178
Spring Packing Corporation 132
Steel Forgings, Inc. 158
Stewart & Stevenson Services, Inc. 2
Thermix Corporation, The 48
Union Asbestos & Rubber Co. 40
Union Wire Rope Corporation 176
United States Rubber Company 14, 15, 49
U. S. Steel Subsidiaries 4, 168
United Supply & Manufacturing Co. 123
Universal Atlas Cement Co. 168
Victor Products Corp. 167
Walker Co., W. L. 157
Walker-Neer Manufacturing Company 80
Warner Lewis Company 133
Welex Jet Services Inc. 60
Well Equipment Mfg. Corp. 147
Wheland Company, The 23
White-Roth Machine Corporation 153
Wichtex Machinery Co., Inc. 187
Williamson, Inc., T. D. 53
Willson Products, Inc. 173
Winpower Mfg. Co. 182
Wood's Sons Co., T. B. 162
Youngstown Sheet and Tube Company 75


### LEGAL

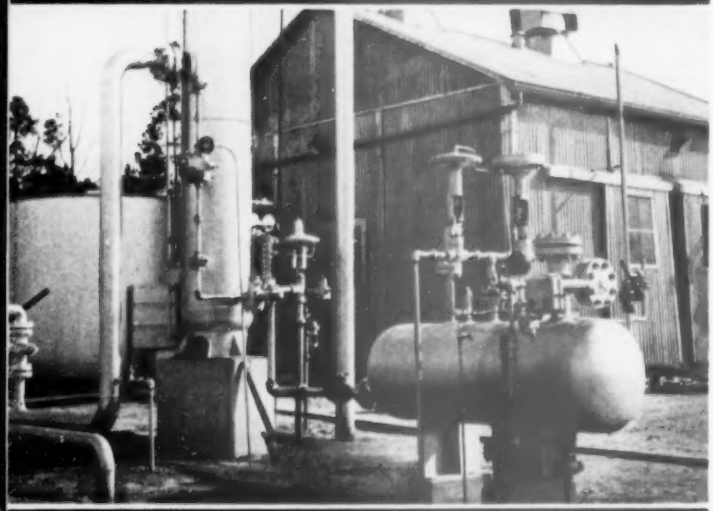
Sealed bids for Oil and Gas Mining Leases on restricted Tribal and Allotted lands of the Fort Berthold Indian Reservation, North Dakota, will be received at the Office of the Superintendent of the said reservation, Elbowoods, North Dakota, until 11:00 A.M., Central Standard Time on July 27, 1953, and will be opened immediately thereafter in the presence of such bidders as may attend. This sale will be conducted under regulations as amended and promulgated by the Secretary of the Interior, 25 CFR 189 (Act of March 3, 1909, 35 Stat. 781, 783; 25 U.S.C. 396) governing the leasing of Allotted lands and 25 CFR 186 (Act of May 11, 1938, 52 Stat. 347; 25 U.S.C. 396 a-f) governing the leasing of Tribal land. All bids shall be enclosed in an envelope addressed to the Superintendent and plainly marked "Bid for Oil and Gas Mining Leases" to be opened at 11:00 A.M., July 27, 1953. The total acreage of which is 29,160.27 acres. All of this land is located in the county of Dunn, State of North Dakota. For additional information call or write the Superintendent of the Fort Berthold Agency, Elbowoods, North Dakota.

# National

## COMBINATION SEPARATOR & FLUID BOOSTER



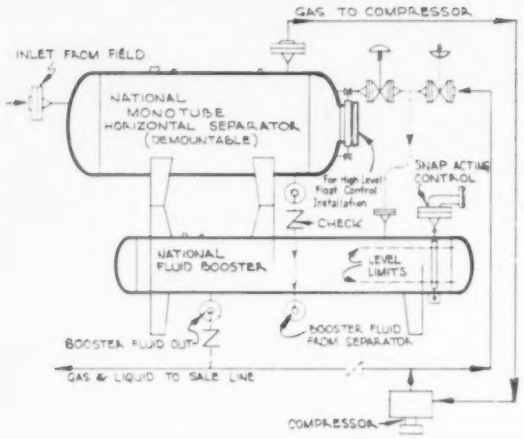
2–30" 500 PSI Oil and Gas Separators with 16" 1200 PSI BOOSTERS. Compressing gas at this site from 350 PSI to 1100 PSI.



24" 1500 PSI Fluid Booster operating in conjunction with a vertical Oil and Gas Separator and Gas Compressor.

30" 1000 PSI Oil and Gas Separator with 10" Water Leg and 24" 1500 PSI BOOSTER. Fluid is boosted from 800 PSI line into 1350 PSI line.

(Patented and Patents Pending)




FLOW DIAGRAM

### APPLICATION

Usual application is in producing areas where well head pressures have fallen to a less pressure than the existing gas sale line pressure. Here the unit is used in conjunction with a gas compressor.

Typical of this situation is the Carthage Field in East Texas which is supplying gas to a 1050 PSI transmission and gathering line whereas the field producing pressures have fallen to 400-600 PSI.

### OPERATION

The fully automatic unit operates as follows: The well product enters the separator where gas is separated and scrubbed of any entrained liquid. The liquid flows to the booster and gas flows to a compressor. When fluid level builds up in the booster to a prescribed level, a snap acting control opens and closes simultaneously the two valves in the line from the discharge side of the compressor. No gas is vented when double valving is used. Pressure equalizes on the booster with that of the compressor outlet. The liquid then flows from the booster and is comingled with the gas downstream of the compressor and flows then into the sale line.

It's National

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Yes, it sure is, and HAZARD lines are cheaper to use if you follow their new ton-mile system
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LAY-SET
AMERICAN CHAIN &
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To prove the savings you get from using HAZARD LAY-SET Preformed drilling lines, HAZARD offers you a Ton-Mile Book which helps you get every last dime's worth of service. With it you can quickly check your actual cost per ton-mile and make a comparison of costs of using any other drilling line made. After using your first HAZARD line, you'll probably be surprised to find how much more the other lines have cost you.

• • •

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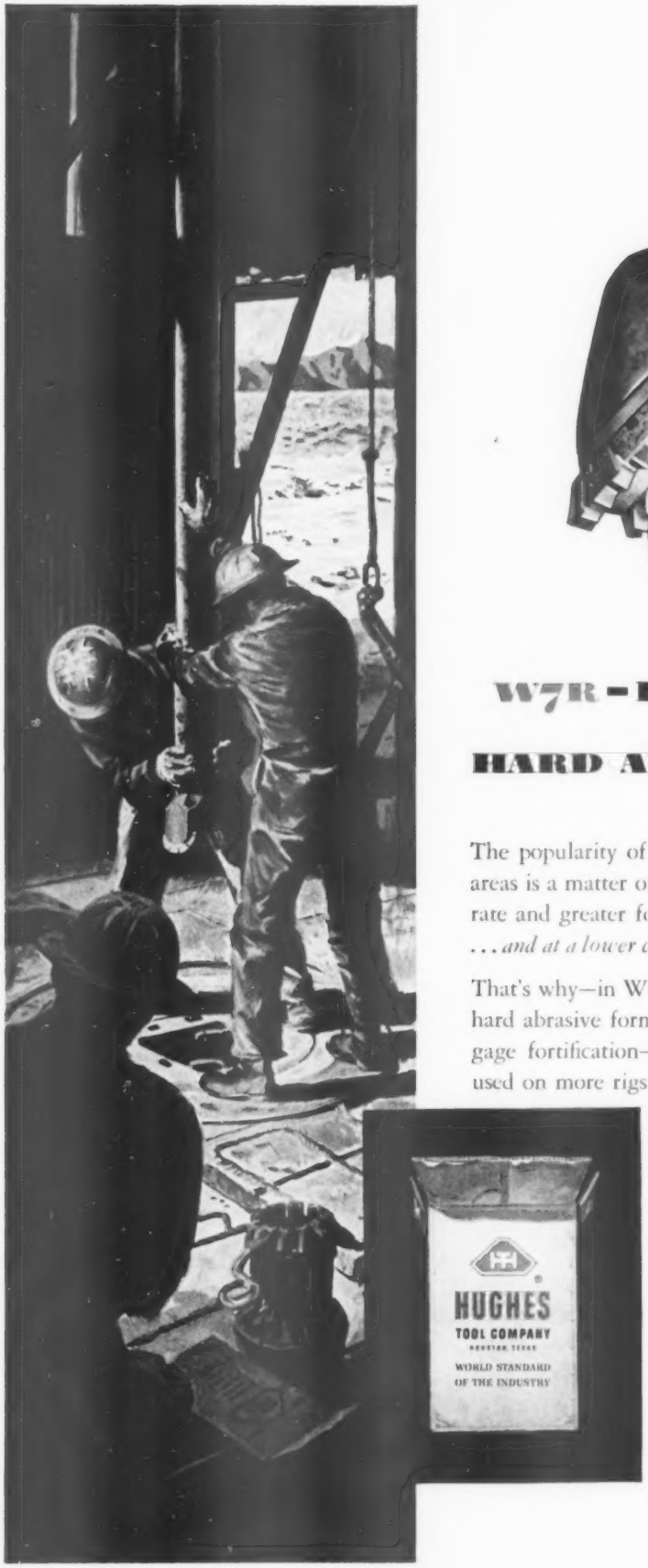
**HAZARD WIRE ROPE DIVISION**
**American Chain & Cable Company, Inc.**

*Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.*



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